MEMORANDUM

TO:	Council, SSC and AP Members
FROM:	Clarence G. Pautzke Executive Director
DATE:	November 20, 1995
SUBJECT:	Final BSAI Groundfish Specifications for 1996

ESTIMATED TIME
8 HOURS
(for all D-1 items)

ACTION REQUIRED

(a) Review Final 1996 BSAI Final Stock Assessment and Fishery Evaluation (SAFE) document.

(b) Approve Final BSAI groundfish specifications for 1996:

1. The Environmental Assessment (EA) for 1996 specifications
2. Acceptable Biological Catch (ABC), and Annual Total Allowable Catch (TAC)
3. Division of the pollock ITAC into the January 1-April 15 ('A' Season) and August 15-December 31 ('B' Season) allowances;
4. Amount of the pollock TAC that may be taken with bottom trawls;
5. Seasonal apportionment of the fixed gear Pacific cod TAC; and
6. Bycatch allowances, and seasonal apportionments of prohibited species (Pacific halibut, red king crab, Tanner crab, and herring) caps to target fishery categories.

BACKGROUND

At this meeting, the Council makes final recommendations on groundfish and bycatch specifications as listed above. The EA for the 1996 specifications, final SAFE report, groundfish ABCs and TACs, and bycatch apportionments need to be approved and made available for public review and comment. NMFS will prepare final rulemaking on the specifications, which will be published in the Federal Register near the end of January.

BSAI SAFE Document

The groundfish plan teams met in Seattle during the week of November 13-17, 1995, to prepare the final SAFE documents provided at this meeting. This SAFE forms the basis for groundfish specifications for the 1996 fishing year. The BSAI SAFE contains the plan team's estimates of biomass and ABCs for all groundfish species covered under the FMP and information concerning PSC bycatch to provide guidance to the Council in establishing PSC apportionments. The attached tables from the SAFE list the plan team's recommended 1996 ABCs and corresponding overfishing levels for each of the species or species complexes. Draft minutes of the BSAI plan team meeting are also attached (Item D-1(a)(1)).

Environmental Assessment for 1996 Groundfish Specifications

The specification process includes Council and public review of an Environmental Assessment that assesses the potential impacts to the marine environment of the Council's proposed specifications. NMFS has prepared the analysis and will distribute it at this meeting. The public will be able to comment on the analysis this week, and after the meeting. Final EAs will be prepared based on the Council's final specifications.

Preliminary ABCs, TACs, and Apportionments

During the week of this Council meeting the SSC and AP recommendations will be provided to the Council. Attached as Item D-1(a)(2) are Tables 6 - 8 from the SAFE summary chapter indicating the plan team's recommended 1996 ABCs and biomass levels. Overall, groundfish stocks are at high abundance.

Adopt Seasonal Allowances for the Pollock Seasons

The FMP requires the Council to apportion pollock in the BSAI between the roe (January 1 - April 15) and non-roe (August 15 - December 31) seasons. For the 1991 and 1992 fisheries, the Council recommended a 40/60 percent split between the roe and non-roe seasons, and a 45/55 percent split for the 1993-1995 pollock fishery. In recommending seasonal allowances of the BSAI pollock TAC, the Council will need to consider the factors presented in Appendix C of the SAFE document.

Limit Amounts of Pollock That Could Be Taken with Bottom Trawls

To control the bycatch of crab and halibut, Amendment 16a allows the Regional Director, in consultation with the Council, to limit the amount of pollock that can be taken by non-pelagic trawl gear. In 1990, the Council recommended a 88%-12% split (midwater-bottom trawl). For the 1991 through 1995 fisheries, the Council noted that additional pollock harvests with non-pelagic trawl gear likely would be constrained by halibut bycatch, and did not recommend a separate pollock TAC for non-pelagic gear. Catch in directed pollock fisheries over the past few years was as follows:

	Pelagic	Non-pelagic	Total catch (mt)	predominant year-class in catch
1992	67 %	33 %	1,926,800	1989, 1984, 1978
1993	85 %	15 %	1,438,200	1989, 1984
1994	93 %	7 %	1,270,800	1989

The trend towards pelagic gear may be due to the increased availability of younger fish. Fishermen have noted that smaller (younger) pollock are found off the bottom, and are thus best targeted with pelagic gear. This trend may begin to reverse with the ageing of the 1989 year-class. Additional data on pollock catch, discard, and bycatch by pelagic and non-pelagic trawls are listed in Table 1 (Item D-1(a)(3)). Economic data for pelagic and non-pelagic pollock fisheries are being analyzed for the proposed pollock IFQ program, but are not available at this time.

Regulations (675.24(2)) require that the Regional Director consider the following information when limiting the amount of pollock TAC that is apportioned to the directed fishery for pollock using non-pelagic trawl gear:

A. The PSC limits and PSC bycatch allowances established under 675.21;

B. The projected bycatch of prohibited species that would occur with an without a limit in the amount of pollock TAC that may be taken in the directed fishery for pollock using non-pelagic trawl gear;

C. Costs of a limit in terms of amounts of pollock TAC that may be taken with non-pelagic trawl gear on the non-pelagic and pelagic trawl fisheries; and
D. Other factors pertaining to consistency with the goals and objectives of the FMP.

Proposed and final apportionment of pollock TAC to the directed fishery for pollock using non-pelagic trawl gear will be published in the Federal Register with the notices of proposed and final specifications defined in 675.20(a)(7).

Adopt Seasonal Apportionments of the Pacific Cod TAC Allocated to Fixed Gear

Amendment 24 regulations allow seasonal apportionment of the Pacific cod TAC allocated to vessels using hook-and-line or pot gear. Seasonal apportionments will be divided among trimesters and established through the annual specifications process. In recommending seasonal apportionments, regulations will require the Council to base its decision on the following information:

1. Seasonal distribution of Pacific cod relative to PSC distribution;
2. Expected variations in PSC bycatch rates in the Pacific cod fishery throughout the fishing year; and
3. Economic effects of any seasonal apportionment of Pacific cod on the hook-and-line and pot gear fisheries.

Under Amendment 24, two percent of the TAC is reserved for jig gear, 44 percent for hook and line, and 54 percent for trawl gear. For the 1995 fisheries, the Council recommended that 68,000 mt of the fixed gear's allocation be released during the first trimester (January 1 - April 30), 18,000 mt be released for the second trimester (May 1 - August 31), and 7,500 for the third trimester. The remaining 16,500 mt of this gear's allocation was held in reserve.

Adopt Bycatch Allowances of Pacific halibut, red king crab, Tanner crab (*C. bairdi*), and herring

Total bycatch limits for prohibited species (PSC) are specified in the FMP, but modifications to apportionments among designated fisheries are allowed under the annual specification process. The Council makes recommendations on the apportionment of PSC among fisheries, and seasonal apportionments of PSC. Information on PSC limits and apportionments is presented in BSAI SAFE Appendix D. Regulations require that seasonal apportionments of bycatch allowances be based on the following types of information:

1. Seasonal distribution of prohibited species;
2. Seasonal distribution of target groundfish species relative to prohibited species distribution;
3. Expected prohibited species bycatch needs on a seasonal basis relevant to change in prohibited species biomass and expected catches of target groundfish species;
4. Expected variations in bycatch rates throughout the fishing year;
5. Expected changes in directed groundfish fishing seasons;
6. Expected start of fishing efforts; and
7. Economic effects of establishing seasonal prohibited species apportionments on segments of the target groundfish industry.

Staff will present a worksheet with SSC and AP recommendations for ABCs, TACs, PSC and seasonal apportionments when the Council addresses this Action Item.

Halibut PSC

For the Trawl Fisheries: Amendment 21 established a 3,775 mt limit on halibut mortality for trawl gear. This limit can be apportioned to the following trawl fishery categories:

1. Greenland turbot, arrowtooth flounder and sablefish;
2. rock sole and "other flatfish;"
3. yellowfin sole;
4. rockfish;
5. Pacific cod; and,
6. pollock, Atka mackerel and "other species."

For Fixed Gear Fisheries: A 900 mt non-trawl gear halibut mortality can be apportioned to the following fishery categories:

1. Pacific cod;
2. Other non-trawl (includes turbot and rockfish; hook-and-line sablefish and jig gear were exempt in 1995); and
3. Groundfish pot (recommended exempt for 1995).

Item D-1(a)(4) is a table indicating 1995 PSC allocations and seasonal apportionments for the trawl and non-trawl fisheries. Item D-1(a)(5) is a current summary of PSC bycatch accounting for the 1995 BSAI fisheries.

Crab PSC

Overall crab PSC limits for the Bering Sea trawl fisheries adopted by the Council in Amendment 16 are:

C. bairdi:	1,000,000 crabs in Zone 1 for a Zone 1 closure 3,000,000 crabs in Zone 2 for a Zone 2 closure
Red king crab	200,000 crabs in Zone 1 for a Zone 1 closure

Zone 1 is comprised of Areas 511, 512, and 516. Zone 2 is comprised of Areas 513, 517 and 521.

Herring PSC

Amendment 16a established an overall herring PSC bycatch cap of 1 percent of the EBS biomass of herring. This cap is to be apportioned to the same six PSC fishery categories listed above, plus a seventh group, mid-water pollock. The Alaska Department of Fish and Game will provide its forecast for 1996 herring biomass at the Council meeting. For 1995, herring biomass was estimated at 1,861,000 mt. The PSC limit is set at 1 percent of the biomass in metric tons. A complete herring assessment should be available for the Council meeting.

What do they say?

Clark, W. G. 1991. CJFAS 48:734-750.

1) "By itself, the very consistent relationship between relative spawning biomass and relative yield, nearly identical for all S-R curves, argues for a biomass-based strategy rather than an exploitation rate strategy.... One could still be reasonably sure of getting something close to MSY simply by holding the spawning biomass in the vicinity of 35-40% of the estimated unfished level."

2) "In all cases the relationship of relative yield to relative spawning biomass is very close for all S-R curves, and the 'maximin yield' fishing mortality rate F_{mmy} occurs at a level of spawning biomass per recruit close to 35% of the unfished level."

3) "The results presented above suggest two methods for obtaining a high yield with little risk when one has no knowledge of the S-R relationship. The first is to hold spawning biomass at 20-60% of the unfished level and harvest the surplus production, whatever that turns out to be. The second is to fish consistently at $F=F_{mmy}$, whatever happens to stock biomass.... Hybrid strategies could be developed for cases where a catch limit recommendation could be made either way but with less than complete confidence. A hybrid strategy could take on some of the adaptive behavior of an exploitation rate strategy while preserving some of the robustness of a biomass strategy."

Clark, W. G. 1993. *In* Management Strategies for Exploited Fish Populations, p. 233-246.

1) "With purely random recruitment variation, average yield varies with spawning biomass per recruit in much the same way as in the deterministic results reported in the previous study.... The location of the optimum differs slightly from the previous study, however; the deterministic optimum is 36% for the typical life history parameters, while the stochastic optimum is 38%. With serially correlated recruitment variation, the results are quite different.... The optimal level of spawning biomass per recruit is about 42%...."

2) "Rightly or wrongly, levels of spawning biomass below 20% of the unfished level are regarded as unsafe or at least worrisome by many people. By this standard, fishing at $F_{35\%}$ entails frequent worries under the operation of half of the spawner-recruit curves when recruitment variation is uncorrelated, while fishing at a rate of $F_{40\%}$ or lower avoids the problem entirely for all but one of the spawner-recruit curves.... When recruitment variation is correlated, the prospects are not hopeful...; spawning biomass will often decline below 20% for most spawner-recruit curves and any fishing mortality rate between $F_{35\%}$ and $F_{45\%}$."

3) "This suggests choosing $F_{40\%}$ as a rule of thumb (as also recommended by Mace 1994), but there are enough differences among particular cases that it would be silly to argue very hard for or against any specific rate between $F_{35\%}$ and $F_{45\%}$."

Mace, P. M. 1994. CJFAS 51:110-122.

1) "Given that (i) $F_{35\%}$ generally exceeded $F_{0.1}$ for the parameter combinations considered here..., (ii) $F_{0.1}$ averaged about $F_{38\%}$ for the empirical estimates obtained by Mace (1991) and Mace and Sissenwine (1993), and (iii) $F_{35\%}$ and $F_{0.1}$ both invariably exceeded F_{msy} at τ=0.2 for all the model-parameter combinations used here, I suggest a default fishing target of at least $F_{40\%}$ as a robust approximation to F_{msy}...."

(Note: $1/\tau$ is a measure of stock "resilience;" it is proportional to the slope of the SRR at the origin.)

Recommendations for 1996 Preseason assumed Discard Mortality Rates for halibut bycatch (b ased on Table 4 in Appendix C).

Region/Target	1990	1991	1992	1993	1994	1995	1993-94 Average	Used in 1995	Recommendation for 1996
BSAI TRAWL									
MWT Pollock	81	81	87	90	85	n/a	88	89	88
Atka mackerel	69	73	62	56	69	n/a	63	59	63
Rock sole/Oflats[1]	58	68	78	72	73	n/a	73	75	73
Pacific cod	68	60	67	62	64	n/a	63	65	63
BT Pollock	65	59	76	78	78	n/a	78	77	78
Rockfish	62	54	59	78	71	n/a	75	69	75
Yellowfin sole[1]	73	74	77	75	71	n/a	73	76	73
Arrowtooth	57	41	-	-	-	n/a	49[2]	49	49
Grnld. turbot	58	38	-	-	59	n/a	49[2]	48	49
GOA TRAWL									
MWT Pollock	63	74	69	63	81	n/a	72	66	72
Atka mackerel	-	-	-	55	41	n/a	48	—	48
Rockfish	61	65	69	62	52	n/a	57	66	57
BT Pollock at-sea	65	56	67	81	-	n/a	74	74	74
BT Pollock shrbsd	65	56	72	54	54	n/a	54	63	54
Shallwtr flatfish	62	61	62	66	67	n/a	67	64	67
Pacific cod	61	55	59	56	55	n/a	56	58	56
Dpwtr fltfsh spr/sum[3]	(57)	(52)	(59)	63	56	n/a	60	59	60
Dpwtr fltfsh fall/win[3]	(57)	(52)	(59)	56	48	n/a	52	59	52
BSAI H&L									
Pacific cod	17	21	18	18	15	11.5[4]	13[2]	11.5	11.5
Sablefish	13	18	19	14	35	n/a	25	17	17[5]
Rockfish	18	29	-	-	-	n/a	24[2]	24	24
Grnld. turbot	-	-	17	21	23	n/a	22	19	22
GOA H&L									
Pacific cod	13	17	30	9	15	n/a	12	20	12
Sablefish	11	28	23	26	19	n/a	23	25	23[5]
Rockfish	15	20	-	-	16	n/a	18[2]	18	18
BSAI POT									
Pacific cod	7	3	12	4	10	n/a	7	8	7
GOA POT									
Pacific cod	10	5	16	20	13	n/a	17	18	17

[1]During 1990 and 1991, "Other flatfish" was grouped with yellowfin sole. Since 1992, the target has been grouped with rock sole.
[2]Average of the two most recent years.
[3]Figures shown for 1990-1992 represent the annual discard mortality rate, i.e., across all seasons.
[4]From Williams and Sadorus (1995).
[5]Plan Team recommendation. For the BSAI fishery, this is an average of 1992 and 1993; the GOA fishery uses and average of 1993 and 1994.

Draft Minutes of the Joint GOA and BSAI Groundfish Plan Team Meeting, November 13-17, 1995

Members Present:

Bering Sea/Aleutian Islands Team
Dave Ackley (ADF&G)
Dave Colpo (NMFS-AFSC)
Loh-lee Low (NMFS-AFSC, Chair)
Richard Merrick (MML)
Brenda Norcross (UAF)
Ellen Varosi (NMFS-AKRO)
Grant Thompson (NMFS-AFSC)
Ivan Vining (ADF&G)
Farron Wallace (WDF)
Gregg Williams (IPHC)
Dave Witherell (NPFMC)

Gulf of Alaska Team
Bill Bechtol (ADF&G)
Kaja Brix (NMFS-AKRO)
Jane DiCosimo (NPFMC)
Rich Ferrero (MML)
Jeff Fujioka (NMFS-AB)
Lew Haldorsen (UAF)
Jim Hastie (NMFS-AFSC)
Jon Heifetz (NMFS-AB)
Jim Ianelli (NMFS-AFSC)
Sandra Lowe (NMFS-AFSC, Chair)
Tory O'Connell (ADF&G)
Farron Wallace (WDF)
Gregg Williams (IPHC)

The Bering Sea/Aleutian Islands (BSAI) and Gulf of Alaska (GOA) Groundfish Plan Teams met November 13-17 at the Alaska Fisheries Science Center. The meeting was open to the public, and several industry representatives attended. A packet of materials was distributed to team members prior to the meeting, and several additional documents were distributed at the meeting. The focus of the meeting was to review new assessments, ecosystem considerations chapter, and research priorities.

The meeting began on Monday afternoon with introductions and a review of the agenda. The teams welcomed new members Ivan Vining, Bill Bechtol, and Tory O'Connell. Kaja Brix reported that a new appendix chapter on annual fishery management actions was drafted and could be included in the final SAFE; team members concurred. The teams met again jointly on Thursday to review research priorities, review the halibut SAFE and ecosystem chapter, receive a presentation from Jim Ianelli on stock synthesis, and discuss biological reference points.

The plan teams considered the issue of which level of relative spawning per recruit, if any, is most appropriate for use in defining a standard target harvest strategy for North Pacific groundfish. Recommendations in favor of values ranging anywhere from 35% to 45% can be found in the scientific literature (see attachment). The teams' current policy on computation of ABC sets an upper limit on fishing mortality at $F_{35\%}$ for cases in which a reliable estimate of F_{MSY} is not available. The teams noted that in January the Council will consider plan amendments addressing the definition of overfishing for North Pacific groundfish. Because it is likely that these amendments will also address the computation of ABC (for example, to insure a buffer between ABC and OFL), the teams prefer not to establish a new policy at this time, and will instead recommend target harvest rates for 1996 consistent with existing plan team policy on a case-by-case basis.

Gregg Williams summarized the status of halibut and provided an updated assessment chapter for the SAFE. Pacific halibut continue to decline in abundance. Coastwide, halibut exploitable biomass was estimated at 243 million pounds at the start of the 1995 season. This represents a decline of 14% between 1994 and 1995. Based on recruitment data for 8 year-olds, the stock decline will continue in the near future. However, the 1987 year-class appears strong in the NMFS BSAI trawl surveys, and may boost biomass in coming years. The team suggested that the GOA trawl surveys also be examined for recruitment information. The team also suggested that halibut biomass be converted to exploitable biomass (mt, round weight), and that biological reference points (e.g., $F_{35\%}$) be added for comparison with groundfish species. There was some discussion about overage/underage provisions of the IFQ program, as it appeared that 1995 catches may be only 80% of the overall quota.

Gregg also reviewed the IPHC recommendations on discard mortality rates to be used for managing the 1996 groundfish fisheries (see attachment). Methodology was the same as used in previous years; that is, rates are based on a two-year average unless a three-year trend is evident. Seasonal effects were examined for GOA deepwater flatfish trawl fisheries and found to be significantly different; therefore, separate rates were recommended. The IPHC staff did not recommend specific discard mortality rates for the sablefish hook and line fishery, as this fishery was exempted from halibut caps in 1995 under the IFQ program. Because the 1994 observer data for this fishery was not characteristic, team members suggested rates of 23% in the GOA and 17% in the BSAI be used for accounting purposes for 1996. Some concern was expressed by team members regarding potential high grading in IFQ fisheries, and discard mortality in recreational and jig fisheries.

The Teams had only a few revisions to the draft ecosystems chapter. Team members agreed that the section on discards in the North Pacific groundfish fishery was a useful and informative chapter; it is based on a much larger NOAA Tech Memo that should be released shortly. There was some discussion about revising Table 12 to illustrate differences in offal production between GOA and BSAI fisheries. The team did not revise the introduction section, as it was noted that the SSC suggested forming a working group to address ecosystem approaches. The team endorses that idea, and also suggested that a plan team or SSC member participate in the USFWS ecosystem management plan. It was noted that there was no additional information available on traditional knowledge. One industry representative suggested that the Council should solicit traditional knowledge via the Council newsletter. The teams commended Richard Merrick for his efforts to bring together the ecosystems chapter.

Both teams drew up a specific list of research priorities (attached to GOA and BSAI team minutes). These are updated and new research priorities; all other research needs previously identified still exist, and are also worthy of research. Team members suggested that the Plan Team and SSC recommendations be widely distributed to funding and research agencies, such as universities, congressional staff, the Alaska fisheries training center, NMFS, States, and the Alaska Fisheries Development Foundation.

The joint meeting adjourned Thursday at about 5 pm, November 16.

Others in attendance at the joint team meetings were:

Lauri Jansen	*Wally Pereyra*	*Todd Clark*
Chris Blackburn	*Lowell Fritz*	*Mike Sigler*
Pat Livingston	*Paul McGregor*	*John Sease*
Joe Sullivan	*Joe Blum*	*Mike Szymanski*
Brent Paine	*Nao Yoshiike*	*Dave Fraser*

UNITED STATES DEPARTMENT OF COMMERCE
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NATIONAL MARINE FISHERIES SERVICE
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November 15, 1995 F/AKC2

From: Vidar G. Wespestad

To: Low Lee Low

Subject: Recomputed pollock projections based on $F_{0.4}$ and reduced 1995 recruitment estimates.

I computed $F_{0.4}$ from spawning biomass-per-recruit to be F=0.3 (U=0.23). Projected biomass and yield based on this level of fishing and least square fitted (Solver)estimates of 1995 numbers-at-age and age 1 survey vs. age 3 cohort analysis regression estimates of 1995 age 3 recruitment differs only slightly from projections at $F_{0.1}$:

$F_{0.1}$

Year	Spawners	Total Biomass	Catch	R	F	Exploit.
1995	9.015	7.698	1.298	7.701	0.29	0.17
1996	10.637	7.362	1.332	5.179	0.31	0.18
1997	8.718	7.300	1.256	6.028	0.31	0.17
1998	9.116	7.726	1.279	7.516	0.31	0.17
1999	9.565	7.935	1.320	6.797	0.31	0.17
2000	10.023	8.336	1.375	7.632	0.31	0.16
2001	10.386	8.603	1.438	7.476	0.31	0.17
2002	10.574	8.733	1.475	7.287	0.31	0.17

$F_{0.4}$

Year	Spawners	Total Biomass	Catch	R	F	Exploit.
1995	9.015	7.698	1.298	7.701	0.29	0.169
1996	10.637	7.362	1.293	5.179	0.3	0.176
1997	8.768	7.341	1.228	6.028	0.3	0.167
1998	9.197	7.793	1.257	7.516	0.3	0.161
1999	9.668	8.021	1.300	6.797	0.3	0.162
2000	10.135	8.430	1.356	7.613	0.3	0.161
2001	10.499	8.699	1.419	7.443	0.3	0.163
2002	10.681	8.825	1.456	7.242	0.3	0.165

If the 1995 recruitment is reduced from the regression projected 7.7 billion age 3 pollock to 3.247 billion projected from 1994 age 2 catch then the following reductions in biomass and yield occur:

$F_{0.1}$

Year	Spawners	Total Biomass	Catch	R	F	Exploit.
1995	7.728	6.348	1.298	3.247	0.318	0.20
1996	8.684	5.981	1.124	5.179	0.31	0.19
1997	7.210	6.229	1.044	6.028	0.31	0.17
1998	8.213	6.995	1.102	7.516	0.31	0.16
1999	9.049	7.474	1.198	6.797	0.31	0.16
2000	9.727	8.045	1.306	7.632	0.31	0.16
2001	10.219	8.425	1.395	7.476	0.31	0.17
2002	10.473	8.621	1.452	7.287	0.31	0.17

$F_{0.4}$

Year	Spawners	Total Biomass	Catch	R	F	Exploit.
1995	7.728	6.348	1.298	3.247	0.318	0.20
1996	8.684	5.981	1.092	5.179	0.3	0.18
1997	7.249	6.262	1.020	6.028	0.3	0.16
1998	8.280	7.051	1.081	7.516	0.3	0.15
1999	9.138	7.548	1.178	6.797	0.3	0.16
2000	9.834	8.135	1.287	7.632	0.3	0.16
2001	10.341	8.528	1.377	7.476	0.3	0.16
2002	10.607	8.735	1.435	7.287	0.3	0.16

The best estimate of 1995 age 3 abundance at this time is the age 1 survey derived estimate of 7.7 billion age 3 pollock. The following table presents the estimated number (billions) of age 1 and age 2 pollock in the annual groundfish survey by year-class:

Bottom Trawl Survey

Year-class	Age 1	Age 2		Year-class	Age 1	Age 2
1978	5.855	1.243		1986	0.291	0.545
1979	2.031	3.967		1987	0.877	0.198
1980	0.990	1.738		1988	0.615	0.245
1981	0.990	0.594	**	1989	1.425	0.897
1982	3.879	0.242		1990	2.082	0.292
1983	0.366	0.254		1991	1.320	0.372
1984	3.957	0.652		1992	2.278	0.592
1985	2.023	0.529		1993	1.251	
Median					1.373	0.545

** 1989 minimal estimate- survey did not cover total distribution of age 1 pollock

It can be seen that the 1992 year-class is above median abundance at age 1 and near median abundance at age 2. The bottom trawl survey does not adequately assess pollock, especially age 2 which is primarily pelagic. Hydroacoustic-midwater trawl surveys provide a better estimate of age 2 abundance, but these estimates are generally lower than estimates from catch-age analyses for the same age:

Year	1979	1982	1985	1988	1991	1994	Median
Year-class	1977	1980	1983	1986	1989	1992	
Survey Age 2 N	46.90	5.280	1.550	1.700	6.870	4.500	4.890
Cohort Analysis Age 2 N	12.71	15.916	5.762	2.738	21.176	5.130	
CAGEAN Age 2 N	13.88	11.521	5.822	2.980	16.466	7.408	

A possible explanation for the discrepancy between survey and catch-age estimates is that the hydroacoustic-mid-water trawl survey is conducted over the outer shelf and younger fish may be further in on the shelf and outside the survey area.

These differences argue that estimates for young pollock should be treated as an index. Estimates for young unfished to lightly fished ages from catch-age models are also questionable, because estimates of F are extremely small as cumulative fishing mortality which provides the estimating power of catch-age models.

Given the observed differences in estimators I recommend that the regression based estimate of 1995 age 3 abundance be retained. It is a more realistic estimate than the proposed 3.2 billion.

Table 6-- Summary of stock abundance, overfishing constraints, and fishing mortality rates for the eastern Bering Sea (EBS), Aleutian Islands (AI), and Bogoslof district in 1996 Biomass and catch are in metric tons.

Species	Area	Biomass[a]	OFL[b]	F_{OFL}[c]	F_{ABC}[d]
Walleye pollock	EBS	7,360,000	1,590,000	0.46	0.30
	AI	87,200	28,200	0.45	0.42
	Bogoslof	1,100,000	330,000	0.40	0.33
Pacific cod		1,640,000	420,000	0.43	0.35
Yellowfin sole		2,850,000	342,000	0.16	0.13
Greenland turbot		135,000	25,100	0.37	0.24
Arrowtooth flounder		576,000	162,000	0.34	0.27
Rock sole		2,360,000	433,000	0.22	0.18
Flathead sole		593,000	140,000	0.23	0.19
Other flatfishes		590,000	120,000	0.20[e]	0.17[e]
Sablefish	EBS	14,100	n/a	n/a	0.10
	AI	12,000	n/a	n/a	0.10
	BSAI	n/a	3,300	0.15	n/a
POP complex					
True POP	EBS	44,100	2,860	0.09	0.06
Other red rockfish[f]	EBS	29,700	1,400	0.05	0.05
True POP	AI	309,000	25,200	0.10	0.06
Sharp/Northern[g]	AI	96,800	5,810	0.06	0.06
Short/Rougheye[h]	AI	45,600	1,250	0.03	0.03
Other rockfish	EBS	7,100	497	0.07	0.07
	AI	13,600	952	0.07	0.07
Atka mackerel	AI	578,000	164,000	0.75	0.49
Squid	BSAI	n/a	3,000	n/a	n/a
Other species		687,000	137,000	0.20	0.045

a/ Projected exploitable biomass for January, 1996
b/ Maximum 1996 catch level allowable under overfishing definition (the "overfishing level").
c/ Maximum fishing mortality rate allowable under overfishing definition.
d/ Fishing mortality rate corresponding to acceptable biological catch.
e/ Based on Alaska plaice.
f/ Sharpchin, northern, shortraker, and rougheye rockfish.
g/ Sharpchin and northern rockfish
h/ Shortraker and rougheye rockfish.

Table 7-- Total allowable catches (TAC) and acceptable biological catch (ABC) for 1995 (Council) and 1996 (Plan Team) ABCs for groundfish in the eastern Bering Sea (EBS), Aleutian Islands (AI), and Bogoslof district. Figures are in metric tons.

Species	Area	TAC (1995) Council	ABC(1995) Council	ABC(1996) Plan Team
Walleye pollock	EBS	1,250,000	1,250,000	1,290,000
	AI	56,600	56,600	26,200
	Bogoslof	1,000	22,100	286,000
Pacific cod		250,000	328,000	357,000
Yellowfin sole		190,000	277,000	278,000
Greenland turbot		7,000	7,000	17,000
Arrowtooth flounder		10,227	113,000	129,000
Rock sole		60,000	347,000	361,000
Flathead sole		30,000	138,000	116,000
Other flatfish		19,540	117,000	102,000
Sablefish	EBS	1,600	1,600	1,100
	AI	2,200	2,200	1,200
POP complex				
True POP	EBS	1,850	1,850	1,800
Other red rockfish	EBS	1,260	1,400	1,400
True POP	AI	10,500	10,500	12,100
Sharp/Northern	AI	5,103	5,670	5,810
Short/Rougheye	AI	1,098	1,220	1,250
Other rockfish	EBS	329	365	497
	AI	693	770	952
Atka mackerel		80,000	125,000	116,000
Squid		1,000	3,110	3,000
Other species		20,000	27,600	27,600
Groundfish complex		2,000,000	2,836,985	3,134,909

Table 8-- Summary of stock biomass, harvest strategy, 1996 acceptable biological catch (ABC), and stock condition for groundfish in the eastern Bering Sea (EBS), Aleutian Islands (AI), and Bogoslof district. Biomass and ABC are in metric tons.

Species	Area	Biomass[a]	Rate[b]	ABC	Relative abundance, trend[c]
Walleye pollock	EBS	7,360,000	$F_{40\%}$	1,290,000	Average, stable
	AI	87,200	$F_{35\%}$	26,200	Low, declining
	Bogoslof	1,100,000	$F_{35\%}$	286,000	Low, unknown
Pacific cod		1,640,000	$F_{35\%}$	357,000	High, stable
Yellowfin sole		2,850,000	$F_{35\%}$	278,000	High, stable
Greenland turbot		135,000	$F_{40\%}$	17,000	Low, declining
Arrowtooth flounder		576,000	$F_{35\%}$	129,000	High, stable
Rock sole		2,360,000	$F_{35\%}$	361,000	High, stable
Flathead sole		593,000	$F_{35\%}$	116,000	High, stable
Other flatfish		590,000	$F_{35\%}{}^{c}$	102,000	High, stable
Sablefish	EBS	14,100	$F_{40\%}$	1,100	Low, declining
	AI	12,000	$F_{40\%}$	1,200	Low, declining
True POP	EBS	44,100	$F_{44\%}$	1,800	Low, declining
Other red rockfish	EBS	29,700	$F=M^{c}$	1,400	Not available
True POP	AI	309,000	$F_{44\%}$	12,100	Average, stable
Sharp/Northern	AI	96,800	$F=M^{c}$	5,810	Not available
Short/Rougheye	AI	45,600	$F=M^{c}$	1,250	Not available
Other rockfish	EBS	7,100	$F=M$	497	Not available
	AI	13,600	$F=M$	952	Not available
Atka mackerel	AI	578,000	$F=_{40\%}$	116,000	High, declining
Squid	BSAI	n/a	F_{his}	3,000	Not available
Other species		687,000	F_{his}	27,600	Not available
Groundfish Complex Total		19,128,200		3,134,909	Above average, stable

a/ Projected exploitable biomass for January, 1995.
b/ Harvest strategy used to compute ABC.
c/ Weighted average of species-specific rates.
d/ Relative abundance based on long-term average, trend based on short-term tendency.

TABLE 1

Catch and Discard in BSAI Directed Pollock Fisheries **1992**

	Pelagic Trawl			Bottom Trawl		
	Catch (mt)	Discard (mt)	Percent Discarded	Catch (mt)	Discard (mt)	Percent Discarded
pollock	1,295,707	80,653	6%	631,140	55,523	9%
Pacific cod	13,492	8,658	64%	19,646	8,404	43%
flatfish	12,132	11,127	92%	18,798	16,047	85%
rockfish	205	180	88%	510	104	20%
other	4,408	3,918	89%	4,863	4,315	89%
total	1,325,944	104,536	8%	674,957	84,393	13%

Catch and Discard in BSAI Directed Pollock Fisheries **1993**

	Pelagic Trawl			Bottom Trawl		
	Catch (mt)	Discard (mt)	Percent Discarded	Catch (mt)	Discard (mt)	Percent Discarded
pollock	1,227,495	41,359	3%	210,744	21,895	10%
Pacific cod	8,648	7,052	82%	17,027	9,347	55%
flatfish	5,951	5,695	96%	13,984	11,878	85%
rockfish	234	227	97%	200	188	94%
other	2,382	1,286	54%	2,831	2,591	92%
total	1,244,710	56,619	5%	244,786	45,899	19%

Catch and Discard in BSAI Directed Pollock Fisheries **1994** (through October 29)

	Pelagic Trawl			Bottom Trawl		
	Catch (mt)	Discard (mt)	Percent Discarded	Catch (mt)	Discard (mt)	Percent Discarded
pollock	1,185,024	20,774	2%	85,784	5,837	7%
Pacific cod	8,230	4,906	60%	7,944	1,317	17%
flatfish	2,958	2,195	74%	4,434	3,553	80%
rockfish	91	61	67%	42	42	100%
other	775	662	85%	466	465	100%
total	1,197,078	28,558	2%	98,670	11,205	11%

TABLE 2

Bycatch of PSC in BSAI Directed Pollock Fisheries 1993

	Pelagic Trawl		Bottom Trawl	
	Bycatch	Bycatch rate	Bycatch	Bycatch rate
red king crab	9,550	0.01	49,370	0.45
other king crab	405	0.00	1,628	0.02
bairdi Tanner crab	392,461	0.32	1,279,104	11.57
other Tanners	217,946	0.18	534,152	4.83
halibut	638	0.51	702	6.36
herring	520	0.42	8	0.07
chinook	34,450	0.03	4,188	0.04
other salmon	239,654	0.19	2,609	0.02

Bycatch of PSC in BSAI Directed Pollock Fisheries 1994

	Pelagic Trawl		Bottom Trawl	
	Bycatch	Bycatch rate	Bycatch	Bycatch rate
red king crab	715	0.00	42,388	0.31
other king crab	141	0.00	616	0.00
bairdi Tanner crab	144,666	0.12	225,098	1.62
other Tanners	304,218	0.25	551,261	3.97
halibut	592	0.49	356	2.56
herring	1,576	1.29	79	0.57
chinook	32,071	0.03	1,833	0.01
other salmon	87,818	0.07	7,444	0.05

*Source: Data from NMFS Alaska Region blend estimates.

**Note: Bycatch units are tons for halibut and herring, and numbers for crab and salmon. Likewise, the bycatch rate could be kilograms/ton or numbers/ton.

Table 1 **1995 BSAI Trawl Fisheries PSC Apportionments and Seasonal Allowances**

Fishery Group	Assumed Mortality\1	Halibut Mortality Cap (mt)	Herring (mt)	Red King Crab (animals) Zone1	C. bairdi Zone1	C. bairdi Zone2
Yellowfin sole	70%	750	315	50,000	225,000	1,525,000
January 20 - August 2		280		35,000		
August 3 - December 31		470		15,000		
Rocksole/other flatfish	70%	690		110,000	475,000	510,000
January 20-March 29		428				
March 30 - June 28		180				
June 29-December 31		82				
Turbot/sablefish/ Arrowtooth	40%	120				5,000
Rockfish	60%	110	8			10,000
Jan. 1 - Mar. 29		30				
Mar. 30 - June 28		60				
June 29 - Dec. 31		20				
Pacific cod	60%	1,550	24	10,000	225,000	260,000
January 20-October 24		1,450				
Oct. 25-December 31		100				
Pollockmackerel/o.species	60%	555	169	30,000	75,000	690,000
January 20-April 15		455				
April 16- December 31		100				
# MW Pollock (Herring)	80%		1346			
TOTAL		3,775	1,861	200,000	1,000,000	3,000,000

\1 Mortality rates of halibut based on rates used in 1994, subject to re-evaluation and revision in June.

Council Recommended 1995 BSAI Non-Trawl Fisheries PSC Bycatch Allowances

Fishery Group	Assumed Mortality*	Halibut Mortality (mt)	Seasonal Apportion (mt)
Pacific Cod	12.5%	725	
Jan 1 - April 30			475
May 1 - August 31			40
Sept. 1 - Dec. 31			210
Other Non-Trawl**	12.5%/15%	175	
Groundfish Pot	5%	Exempt	
TOTAL		900 mt	

* Mortality rates based on rates used in 1994, subject to re-evaluation and revision in June.

** Includes hook & line fisheries for rockfish and Greenland turbot.
Sablefish hook & line fisheries will be exempted from the halibut mortality cap.
Jig gear will also be exempted from the halibut mortality cap.

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1995 BERING SEA/ALEUTIAN ISLANDS FISHERIES PROHIBITED SPECIES BYCATCH MORTALITY

TRAWL HERRING, BSAI

Fishery group	Herring (mt)	Cap (mt)	%
Pacific cod	6	24	26%
Yellowfin sole	57	315	18%
Midwater pollock	780	1,345	58%
Other	124	169	73%
Rockfish	0	8	0%

TRAWL SALMON, BSAI

Fishery group	Chinook (#'s)	Other (#'s)
Midwater pollock	10,159	16,303
Pacific cod	6,853	666
Rock sole/Other flatfish	548	37
Yellowfin sole	7	1,209
Other	4,729	3,276
Rockfish	165	182

TRAWL BAIRDI TANNER CRAB

	ZONE 1			ZONE 2		
Fishery group	Crabs (#'s)	Cap (#'s)	%	Crabs (#'s)	Cap (#'s)	%
Pacific cod	218,637	225,000	97%	44,556	260,000	17%
Rock sole/Other flatfish	334,398	475,000	70%	79,603	510,000	16%
Yellowfin sole	260,268	225,000	116%	1,115,287	1,525,000	73%
PLCK/AMCK/OTHER	107,008	75,000	143%	50,704	690,000	7%
Rockfish	0	0	0%	0	10,000	0%
GTRB/ARTH/SABL	0	0	0%	66	5,000	1%

TRAWL RED KING CRAB

	ZONE 1		
Fishery group	Crabs (#'s)	Cap (#'s)	%
Pacific cod	2,450	10,000	25%
Rock sole/Other flatfish	20,524	110,000	19%
Yellowfin sole	6,468	50,000	13%
PLCK/AMCK/OTHER	3,594	30,000	12%

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1995 BERING SEA / ALEUTIAN ISLANDS FISHERIES
TRAWL HALIBUT BYCATCH MORTALITY (METRIC TONS)

WED	PACIFIC COD	YELLOWFIN SOLE	ROCK SOLE/ FLATHEAD SOLE/ OTHER FLATFISH	PLCK/AMCK/ OTHER	ROCKFISH	ARROWTOOTH/ SABLEFISH/ TURBOT
01/07/95	0	0	0	0	0	0
01/21/95	8	0	14	4	0	0
01/28/95	49	0	35	17	0	0
02/04/95	22	0	42	62	0	0
02/11/95	8	0	109	40	0	0
02/18/95	61	0	209	77	0	0
02/25/95	156	1	37	22	15	0
03/04/95	158	9	14	4	9	0
03/11/95	171	5	3	2	9	0
03/18/95	228	30	1	1	1	0
03/25/95	90	22	12	2	0	0
04/01/95	93	30	9	1	0	0
04/08/95	108	30	74	3	8	0
04/15/95	172	74	24	0	5	0
04/22/95	124	41	1	1	1	0
04/29/95	39	29	4	0	0	7
05/06/95	0	43	0	0	0	272
05/13/95	0	0	0	0	1	2
05/20/95	0	0	0	0	1	0
06/03/95	0	0	0	0	0	0
06/24/95	0	0	0	0	0	0
07/01/95	0	0	0	0	0	0
07/08/95	0	0	4	0	0	0
07/15/95	0	0	4	5	0	0
07/22/95	0	0	5	0	0	0
07/29/95	0	7	88	0	0	0
08/05/95	0	97	0	0	0	0
08/12/95	0	106	0	1	0	0
08/19/95	0	64	0	64	0	0
08/26/95	0	28	0	40	0	0
09/02/95	2	15	0	15	0	0
09/09/95	0	4	0	8	0	0
09/16/95	0	1	0	13	0	0
09/23/95	3	5	0	15	0	0
09/30/95	0	61	0	9	0	0
10/07/95	0	57	0	2	0	0
10/14/95	0	1	0	2	0	0
10/21/95	0	0	0	1	0	0
10/28/95	13	0	0	12	17	0
11/04/95	2	0	0	0	5	0
11/11/95	0	0	0	0	0	0
11/18/95	0	0	0	0	0	0
	1,507	757	691	423	72	282
SEASONAL CAP:	1,550	750	690	555	110	120
% OF CAP:	97%	101%	100%	76%	66%	235%
ANNUAL CAP:	1,550	750	690	555	110	120
% OF CAP:	97%	101%	100%	76%	66%	235%

TOTAL HALIBUT MORTALITY : 3,732

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1995 BERING SEA / ALEUTIAN ISLANDS FISHERIES
FIXED GEAR HALIBUT BYCATCH MORTALITY (METRIC TONS)

	PACIFIC COD HOOK & LINE		OTHER SPECIES HOOK & LINE, JIG		ALL GROUNDFISH POT GEAR	
WEEK	WEEKLY	TOTAL	WEEKLY	TOTAL	WEEKLY	TOTAL
01/07/95	26	26	0	0	0	0
01/14/95	25	52	0	0	0	0
01/21/95	19	70	0	0	0	0
01/28/95	18	89	0	0	0	0
02/04/95	20	108	0	0	0	0
02/11/95	21	129	0	0	0	0
02/18/95	20	148	0	0	0	0
02/25/95	15	163	0	0	0	0
03/04/95	21	185	0	0	1	1
03/11/95	22	206	0	0	0	1
03/18/95	19	225	0	0	0	1
03/25/95	17	242	0	0	0	1
04/01/95	19	261	0	0	0	1
04/08/95	24	285	1	1	0	1
04/15/95	23	308	0	1	0	1
04/22/95	26	335	0	1	0	1
04/29/95	25	360	0	1	0	2
05/06/95	29	389	12	14	0	2
05/13/95	5	394	59	73	1	3
05/20/95	2	396	9	81	1	3
05/27/95	0	396	0	81	1	4
06/03/95	0	396	0	81	0	4
06/10/95	0	396	0	81	0	5
06/17/95	0	396	1	82	0	5
06/24/95	0	396	0	82	0	5
07/01/95	0	396	0	82	0	5
07/08/95	0	396	0	83	0	5
07/15/95	0	396	1	83	0	5
07/22/95	0	396	0	83	0	6
07/29/95	0	396	0	83	0	6
08/05/95	0	396	0	83	0	6
08/12/95	0	396	0	83	0	6
08/19/95	0	396	0	83	0	6
08/26/95	0	396	0	83	0	6
09/02/95	11	407	0	83	0	7
09/09/95	59	466	0	83	0	7
09/16/95	47	513	0	83	0	7
09/23/95	41	554	0	83	0	7
09/30/95	44	598	0	84	0	8
10/07/95	41	639	0	84	1	8
10/14/95	40	679	0	84	0	9
10/21/95	11	690	1	84	0	9
10/28/95	0	690	2	87	0	9
11/04/95	0	690	0	87	0	9
11/11/95	0	690	0	87	0	9
11/18/95	2	691	0	87	0	9

PCOD SEASONAL CAP: 795
% OF SEASONAL CAP: 87%

OTHER SEASONAL CAP: 105
% OF SEASONAL CAP: 83%

Pot gear is exempt from bycatch allowances

Draft Minutes of the
Bering Sea/Aleutian Islands Groundfish Plan Team
Meeting, November 13-17, 1995

Members Present:

Ellen Varosi (NMFS-AKRO)	*Grant Thompson (NMFS-AFSC)*
Dave Ackley (ADF&G-Juneau)	*Brenda Norcross (UAF)*
Loh-lee Low (NMFS-AFSC, Chairman)	*Dave Colpo (NMFS -AFSC)*
Richard Merrick (NMML)	*Ivan Vining (ADF&G -Kodiak)*
Farron Wallace (WDF)	*Dave Witherell (NPFMC)*

The Bering Sea/Aleutian Islands (BSAI) Groundfish Plan Team met November 13-17 at the Alaska Fisheries Science Center in Seattle. The meeting was open to the public, and several industry representatives attended. A packet of materials was distributed to team members prior to the meeting, and several additional documents were distributed at the meeting. The focus of the meeting was to review updated stock assessments and develop research priorities.

The meeting began with a review of the agenda and general business. Minutes from the September meeting were approved. Brenda Norcross agreed to record research priorities as they arose in team deliberations. Dave Witherell initiated a workgroup to prepare an EA/RIR which would streamline and update the BSAI FMP. Brenda, Richard, Ivan, Loh, and Ellen volunteered to assist Dave with preparing a draft for September 1996.

The team reviewed updated assessments of groundfish for the 1996 fishery. Team recommendations are discussed in the SAFE summary chapter, and therefore not repeated here. Rather, these minutes reflect team deliberations and suggestions to assessment authors regarding future assessments.

Taina Honkalehto and Neal Williamson of the AFSC briefed the team on pollock status in the Aleutian basin (Bogoslof) area. The 1995 echo-integration survey, conducted in February and March, found primarily pre-spawning fish, with the 1978 and 1989 year-classes dominating. The team discussed reasons why the 1995 survey estimate showed an increase in all age groups since the 1994 survey. This was thought to be a combination of factors including recruitment of the 1989 year-class, more older pollock available, acoustic sampling variability, and trawl/age sampling error. The team agreed to use the biomass of 1.10 million mt generated from the survey, but wished to convey caution as this survey was only one data point showing an upturn in biomass.

Vidar Wespestad briefed the teams on his assessment of the eastern Bering Sea pollock stock. The 1989 year-classes dominated the 1994 fishery. The 1993 and 1994 year-classes appear to be average, or slightly below average. During the meeting, the team requested that Vidar provide ABC values based on a more conservative $F_{40\%}$. He agreed and supplied the data later in the meeting (see attached memo). The team recommended that ABC for the eastern Bering Sea pollock stock be based on $F_{40\%}$ using the least squares ("solver") estimates of recruitment. **The team felt that a conservative harvest rate for EBS pollock was warrented on the basis of the stock's dependence on the 1989 year-class.**

There was some discussion about the Aleutian Islands pollock assessment and management of this stock. Survey data indicated a sharp decline in biomass. In addition, it was noted that AI Steller sea lions are also in decline. **The team recommends that the AI pollock stock be managed as bycatch only for 1996**, although team members expressed concern about forgone yields and revenue. Industry representatives testified that roe recovery rates have been much higher in the AI area than elsewhere. Effort distribution data suggest that the fishery occurs primarily in the eastern AI and adjacent to the Bogoslof area. A portion of the AI fish harvested may actually be from the Aleutian Basin stock. The team requested that authors provide estimates of $F_{40\%}$ for all pollock stocks in next year's assessment.

A revised Pacific cod assessment was provided, which incorporated new survey data and a new maturity schedule. Synthesis modeling indicated above average 1989, 1990, and 1991 year-classes, followed by below average year-classes in 1993 and 1994. Discussion regarding a Pacific cod ABC focused on whether or not to apply an $F_{40\%}$ harvest strategy, as was recommended by the chapter author. It was noted that the SSC and GOA team recommended an $F_{40\%}$ rate for the GOA stock, which exhibits lower recruitment variability than the BSAI stock. However, the team felt that the high biomass and increasing trend exhibited by this stock justified an ABC exploitation rate of $F_{35\%}$. The team supports Grant's efforts to bring together the GOA and BSAI assessments, and also suggested that the issue of survey catchability (q) be explored.

Flatfish stocks, with the exception of Greenland turbot, remain at high abundance. Many of these assessments have been updated using the synthesis model. For flathead sole, biomass estimates were based on knife-edged recruitment of age 3+. Team members suggested that for next year, the assessment author incorporate fishery selectivity, or use age 5+ fish to calculate biomass. Greenland turbot stocks continue to decline, and recruitment is low. The synthesis model used to estimate ABC was conservative, and team members agreed with the authors' ABC recommendation. However, **the team has serious conservation concerns about the Greenland turbot stock, and recommended that TAC be set at bycatch only**. A rough examination of 1994 data indicated that bycatch needs for other fisheries amounted to about 3,000 mt.

A conservative synthesis model was also used to calculate biomass of Aleutian Islands Pacific ocean perch. The model was somewhat biased because the strong 1965 year-class was dropped from the simulations. The team recommended including this year-class in future modeling. **Team members concurred with the authors' recommendation to reduce the potential for localized overharvesting of POP by setting separate ABCs for each AI subarea.** An average of the two most recent surveys was used to divide the ABC into the Eastern (25%), Central (25%), and Western (50%) Aleutian Island subareas. For the other rockfish complex, the Team requested the author to recalculate ABC using the natural mortality rate for thornyheads in the GOA. Thornyheads are the primary component of this complex, and no estimate of M is available for BSAI stocks.

Conservative exploitation rates ($F_{40\%}$) were used to make recommendations for Atka mackerel and sablefish ABCs. The team recommended that ABCs for Atka mackerel be based on $F_{40\%}$ because the stock exhibits variable recruitment, biomass is declining, and they are an important prey species for sea lions. In addition, it was noted that the $F_{40\%}$ rate is very similar to $F_{0.1}$ estimated for this stock. **The team recommended apportioning the Atka mackerel ABC among the AI subareas using the average biomass distribution from the last two surveys.** For AI sablefish, the team did not recommend an apportionment among subareas because they are a highly mobile species, and the ABCs resulting from a split would be quite small.

The team reviewed a draft environmental assessment/regulatory impact review (EA/RIR) for a proposed plan amendment that would allow additional flexibility in allocating bairdi PSC among bycatch limitation zones. Dave Colpo summarized the impacts of the four alternatives, based on his modeling. Analysis indicated that a 20% increase in the Zone 1 bairdi limit would result in the following:

1. increase in fishing time for the cod trawl fishery (1 week) and yellowfin sole trawl fishery (1 day);
2. may increase income in cod trawl fishery ($ 3 million), but not to the nation as all cod would be caught by other gears anyway;
3. would have no impacts on groundfish stocks;
4. may slightly increase bycatch of bairdi (50,000) and halibut mortality (100 mt) in the trawl fishery.

The team did not recommend a specific alternative, but noted that biological impacts of the proposed amendment were minor.

The team developed a set of research priorities. These are actually research needs which are in addition to those areas of research previously identified. The team also encourages the NMFS AKRO and AFSC to resolve catch estimates for past years. The BSAI team meeting adjourned at about noon on Friday, November 17.

Others in attendance at the BSAI team meetings were:

Lauri Jansen	*Nao Yoshiike*	*Joe Blum*
Brent Paine	*Mike Sigler*	*Lowell Fritz*
Wally Pereyra	*Todd Clark*	*Paul McGregor*
Dave Fraser	*Mike Szymanski*	

Bering Sea and Aleutian Islands Plan Team
1995 Research Needs

1. Life history and distribution patterns of Greenland turbot.

2. Vertical distribution of pollock by sex, size, and age. Trawl locations conducted during the acoustic survey may bias age analysis. Generally, the net is towed through a concentration of pollock, which may also be not representative of the size distribution.

3. Stock structure information for Atka mackerel and Pacific cod. How do they migrate between the Bering Sea and Gulf of Alaska? Should BSAI and GOA stocks should be assessed together as one?

4. Abundance and distribution data for forage fish. Forage fish species are an important part of the Bering Sea ecosystem, yet little is known about these stocks

5. Effects of bottom trawling and other gear types on habitat. In situ studies and comparisons of open and closed areas were suggested.

6. Examine the fishing power of the bottom trawl survey for pollock. Does it reflect population trends? Survey data indicate stable populations in both the BSAI and GOA areas.

STATE OF ALASKA

TONY KNOWLES, GOVERNOR

AGENDA D-1(b)
DECEMBER 1995
SUPPLEMENTAL

DEPARTMENT OF FISH AND GAME

COMMERCIAL FISHERIES MANAGEMENT AND DEVELOPMENT DIVISION

P.O. BOX 25526
JUNEAU, ALASKA 99802-5526
PHONE: (907) 465-4210

RECEIVED NOV 30 1995

November 30, 1995

Dr. Clarence Pautzke
Executive Director
North Pacific Fisheries Management Council
P.O. Box 103136
Anchorage, AK 99510

Dear Dr. Pautzke:

The Alaska Department of Fish and Game estimates that the biomass of Bering Sea herring stocks returning to spawn in the spring of 1996 between Port Moller and Norton Sound will be approximately 169,700 metric tons. This is a modest decline from last year's estimate of 186,075 metric tons.

Under Amendment 16A to the Bering Sea/Aleutians groundfish management plan, a prohibited species catch (PSC) limit would be set at 1% of this biomass or 1,697 metric tons.

Sincerely,

/FOR

Robert C. Clasby
Director

Enclosure

cc: Dave Witherall

Table 1. Summary of 1996 forecast spawning biomass, harvests, and harvest policies for Bering Sea herring stocks.

Fishery	Forecast Harvest	Spawning Biomass	Threshold	Exploitation Rate
	(short tons - 2,000 lbs)			
Port Moller	750	3,750		20%
Bristol Bay (Togiak)		129,989 [a]	35,000	20%
Seine				
Gill Net				
Kuskokwim Area				
Security Cove	1,125	5,623	1,200	20%
Goodnews Bay	569	2,847	1,200	20%
Cape Avinof	484	3,230	500	15%
Nelson Island	996	6,638	3,000	15%
Nunivak Island	839	4,197	1,500	20%
Cape Romanzof	696	3,481	1,500	20%
Norton Sound	5,461	27,307	7,000	20%
Total:	**10,920**	**187,062**	**short tons**	
		169,700	metric tons	
PSC Limit (at 1% of biomass):		1,697	metric tons	

AGENDA D-1(c)
DECEMBER 1995
SUPPLEMENTAL

Alaska Groundfish Data Bank

RECEIVED
NOV 29 1995

TO: RICK LAUBER, CHAIRMAN
NORTH PACIFIC FISHERY MANAGEMENT COUNCIL

RE: PACIFIC OCEAN PERCH REBUILDING PLAN

DATE: NOVEMBER 29, 1995

SENT BY FAX: 1 PP

ALASKA GROUNDFISH DATA BANK SUPPORTS ALLOWING PACIFIC OCEAN PERCH TAC'S TO BE SET INDEPENDENTLY IN EACH GULF OF ALASKA FMP AREA

Dear Rick:

Alaska Groundfish Data Bank supports the existing Pacific Ocean Perch rebuilding plan. We see increased interest by shorebased processors and catcher vessels in participating in a Pacific Ocean Perch fishery and note that in the 1960's Pacific Ocean Perch was a major component of the Gulf biomass.

In the Central Gulf there appears to be several years of strong recruitment which will be moving into the fishery in the near future. Shorebased operations have not participated in the Pacific Ocean Perch fishery due to its low abundance, but with the prospect of a substantially increased abundance shorebased interest in also increasing.

Further, a Pacific Ocean Perch fishery offers the potential for a fishery with low halibut bycatch; in fact, it may be possible to midwater trawl Pacific Ocean Perch.

We also respect the interest of those in Southeast Alaska and note that unlike the Central Gulf Pacific Ocean Perch fishery, the stock in Southeast does not appear to have any strong recruitment coming on line.

To allow continued conservation on the Southeast Alaska Pacific Ocean Perch stocks and allow a directed fishery in the Central/Western Gulf on POP where the stocks have strong recruitment and may become an increasingly abundant segment of the biomass we support alternative 2 which allows setting the POP TAC at or below the amount dictated by the Rebuilding Plan in one or more of the Gulf regulatory areas or districts.

Alternative 2 appears to allow the different conservation needs and management goals in the different Gulf areas to be met by using different methods and rationales for setting the TAC's.

We want to emphasize that we support continuance of the current Pacific Ocean Perch rebuilding plan. The conservatism built into the plan seems more than adequate to successfully manage and maintain a growing biomass of this long lived species.

Sincerely,

Chris Blackburn, Director
Alaska Groundfish Data Bank

Chris Blackburn • Director • P.O. Box 2298 • Kodiak, Alaska 99615 • (907) 486-3033 • FAX (907) 486-3461

PLAN TEAM MEMBERS 1995

BSAI Plan Team (11 Members)

- AFSC (4)
- NMFS Regional Office (1)
- Council Staff (1)
- ADF&G (2)
- Univ. Alaska (1)
- Washington DF&W (1)
- Halibut Commission (1)

- Marine Bird Specialist (?)

PLAN TEAM ABC PROCEDURE

1. ABC = F * BIOMASS

2. Exploitation Rate depends on Quality of Data

   a. Data available: S-R, Fecundity, Maturity, Growth, Mortality
      Maximum $F_{abc} = F_{msy}$

   b. Data available: No S-R relationship and data above
      Maximum $F_{abc} = F_{30\%}$

   c. Data available: Natural Mortality
      Set $F_{abc} = M$

3. Rule: F_{abc} below $F_{overfishing}$

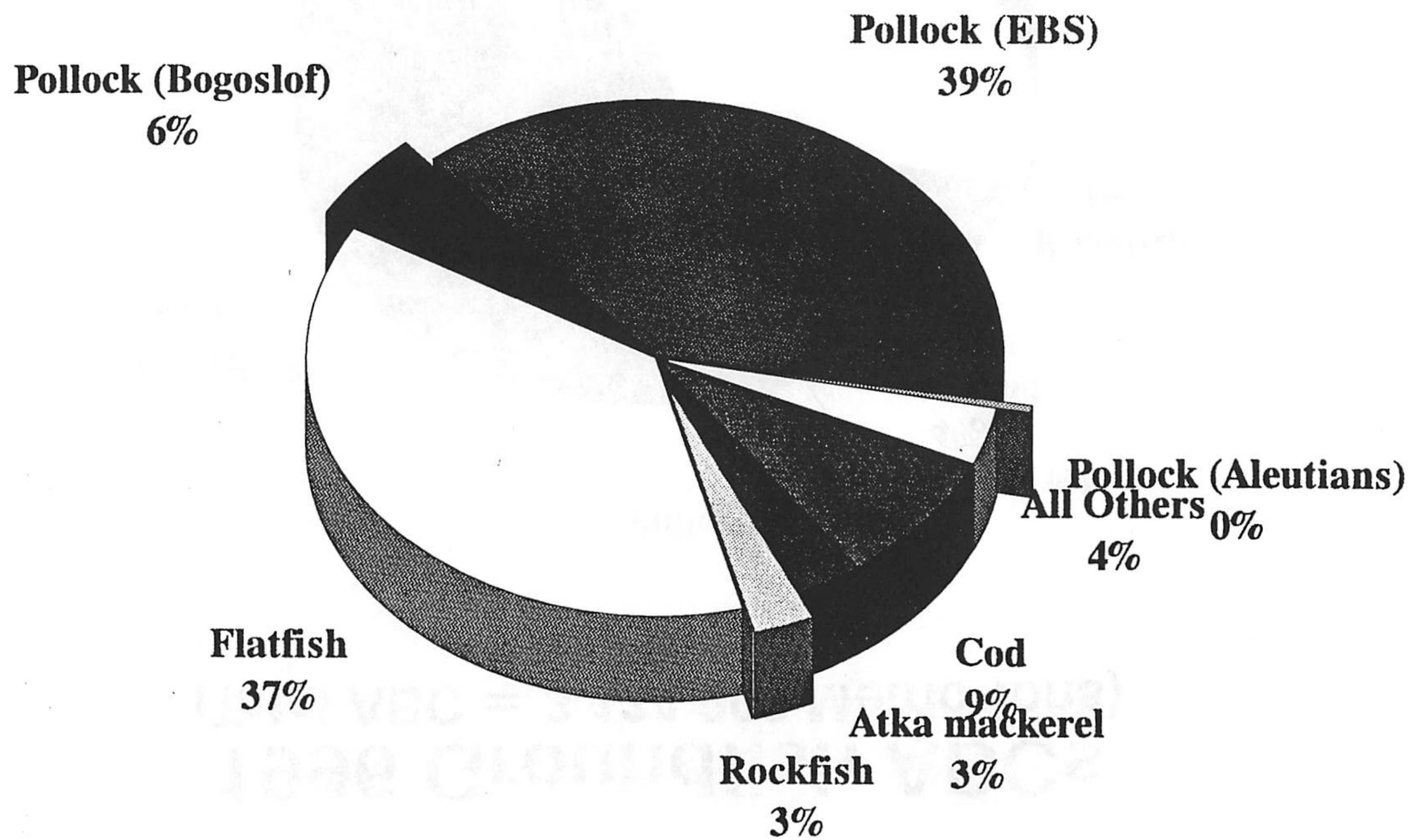
4. Generally for BSAI Stocks:

$$F_{overfishing} = F_{30\%}$$

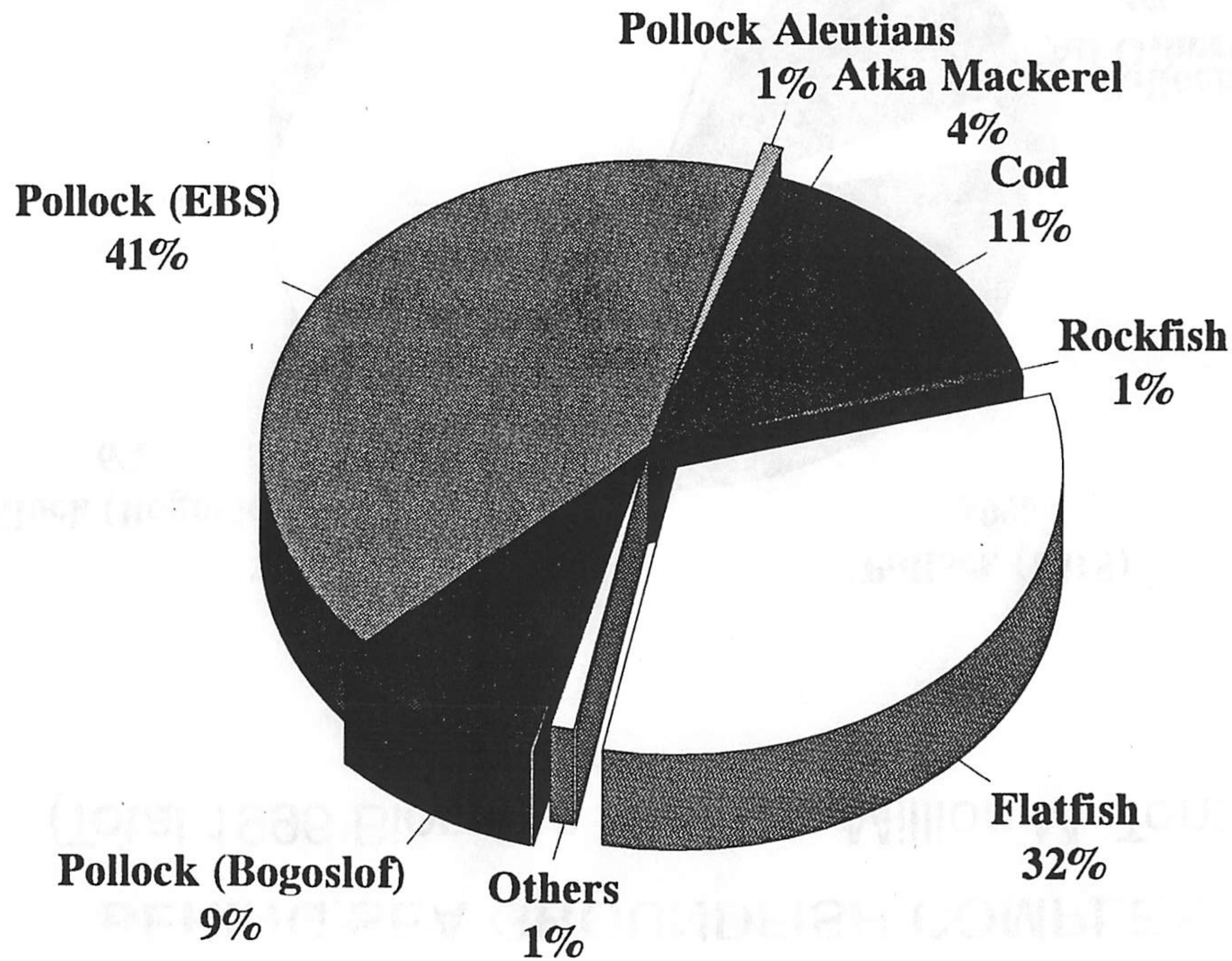
$$F_{abc} = F_{35\%} \text{ or } F_{40\%}$$

BERING SEA GROUNDFISH COMPLEX

(Total 1996 Biomass = 19.1+ Million M. Tons)



1996 Groundfish ABCs
(Total ABC = 3,134,909 Metric Tons)

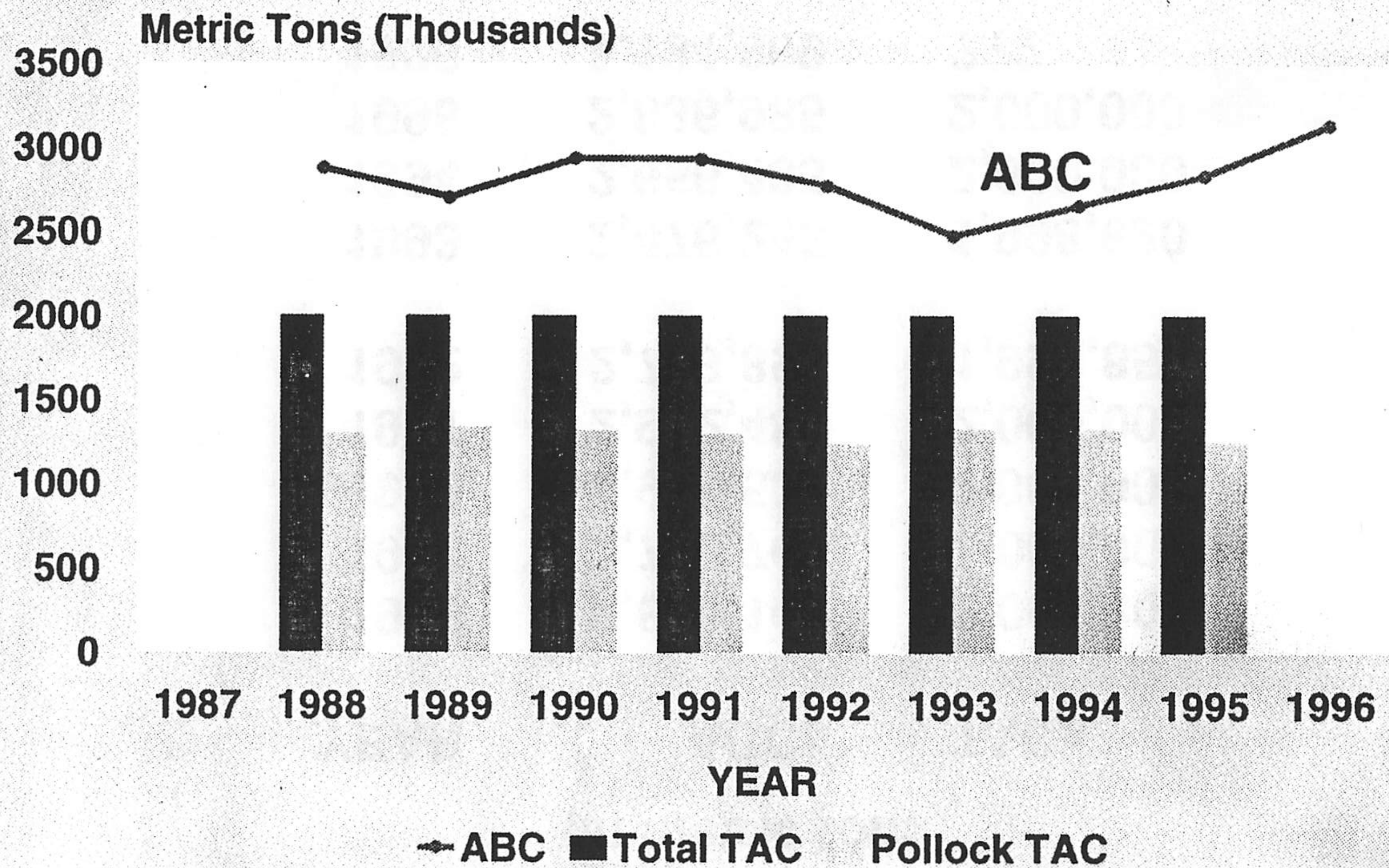


BSAI 8-YEAR HISTORY OF ABCs and TACs
(In metric tons)

YEAR	ABCs	TACs
1988	2,876,100	2,000,000
1989	2,700,700	2,000,000
1990	2,938,500	2,000,000
1991	2,932,485	2,000,000
1992	2,773,355	1,999,855
1993	2,476,245	1,998,620
1994	2,656,435	2,000,000
1995	2,836,985	2,000,000
1996	3,134,909	???

BSAI 8-Year History of ABCs and TACs

1988-1996

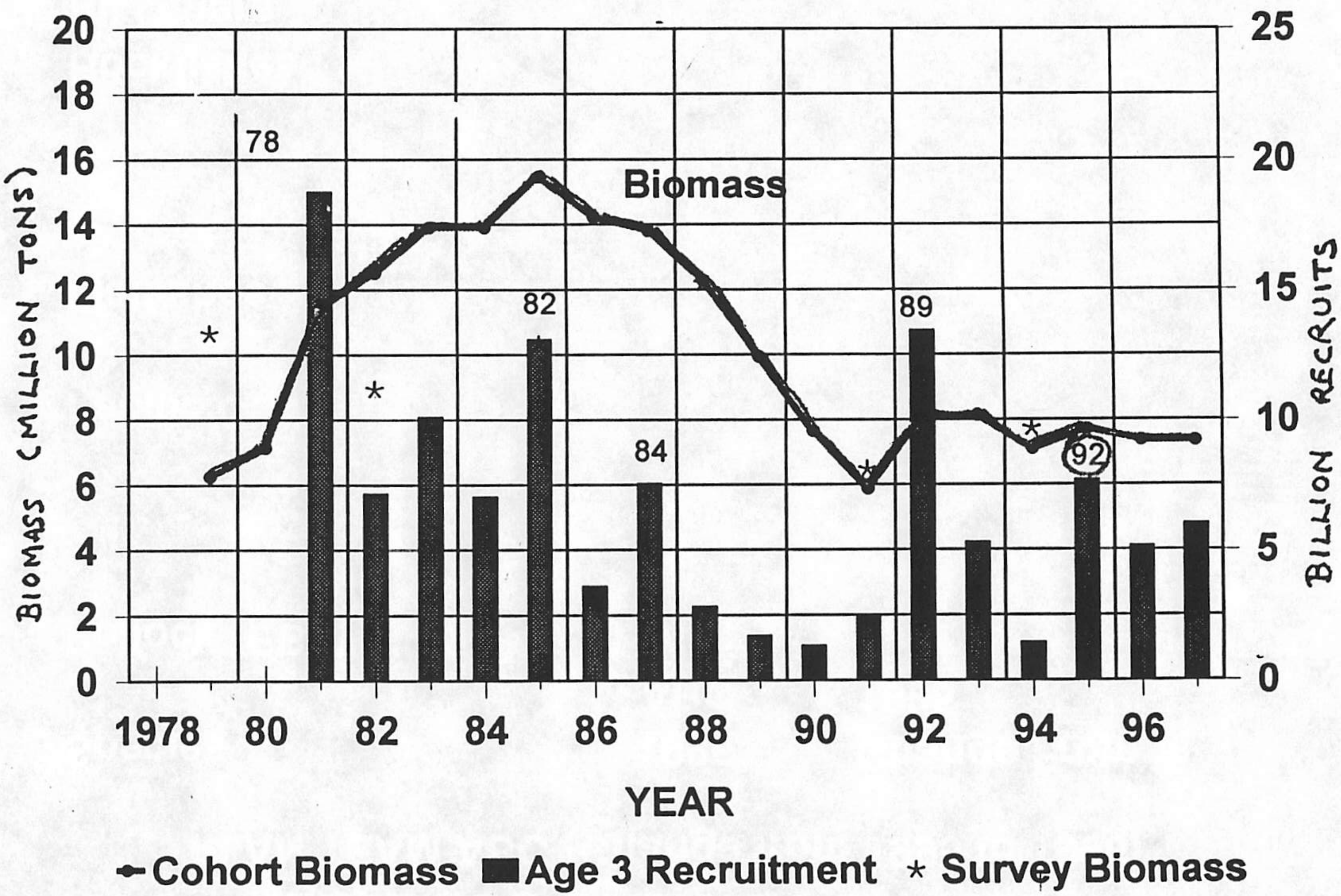


BSAI SOS UPDATE FOR 1996

PLAN TEAM ABC (Change from 1995 to 1996)

Species	1996 ABC	Change From 1995
Pollock (EBS)	1,290,000	Up 40,000
(Aleutians)	[illegible]	Down [illegible]
(Bogoslof)	266,000	Up 263,900
Pacific Cod	357,000	Up 29,000
Flatfishes	1,003,000	Up 4,000
Sablefish	2,300	Down 1[illegible]
Atka mackerel	117,000	[illegible]
Rockfishes	23,809	Up 2,[illegible]
All Others	[illegible]	[illegible]
TOTAL	3,152,909	Up [illegible]

Eastern Bering Sea Pollock
Biomass and Age 3 Recruitment 1978-97



EASTERN BERING SEA POLLOCK

1. Biomass Estimates

Best estimate for 1996 = 7.36 MMT
(From Cohort Analysis Solver Procedure)

2. Exploitation Rates

$F_{35\%}$ = 0.38 (Annual rate = 28%)

$F_{40\%}$ = 0.30 (Annual rate = 23%)

$F_{0.1}$ = 0.31 (Annual rate = 23%)

3. Plan Team Recommended to Use $F_{40\%}$

Reasons:

a. SSC recommended to move towards $F_{35\%}$ or $F_{40\%}$
b. Need to be more conservative than F35% strategy because
   --- Dependence on 1989 and 1992 (?) year classes
   --- Present biomass much lower than historic high
   --- Biomass trend is stable, not increasing
c. Upper limit of F_{abc} is capped near 0.31 = $F_{0.1}$
d. Desire to have wider buffer with $F_{overfsihing}$

4. Estimate of ABC

ABC = 1,290,000 mt
(Up 40,000 mt from 1995)

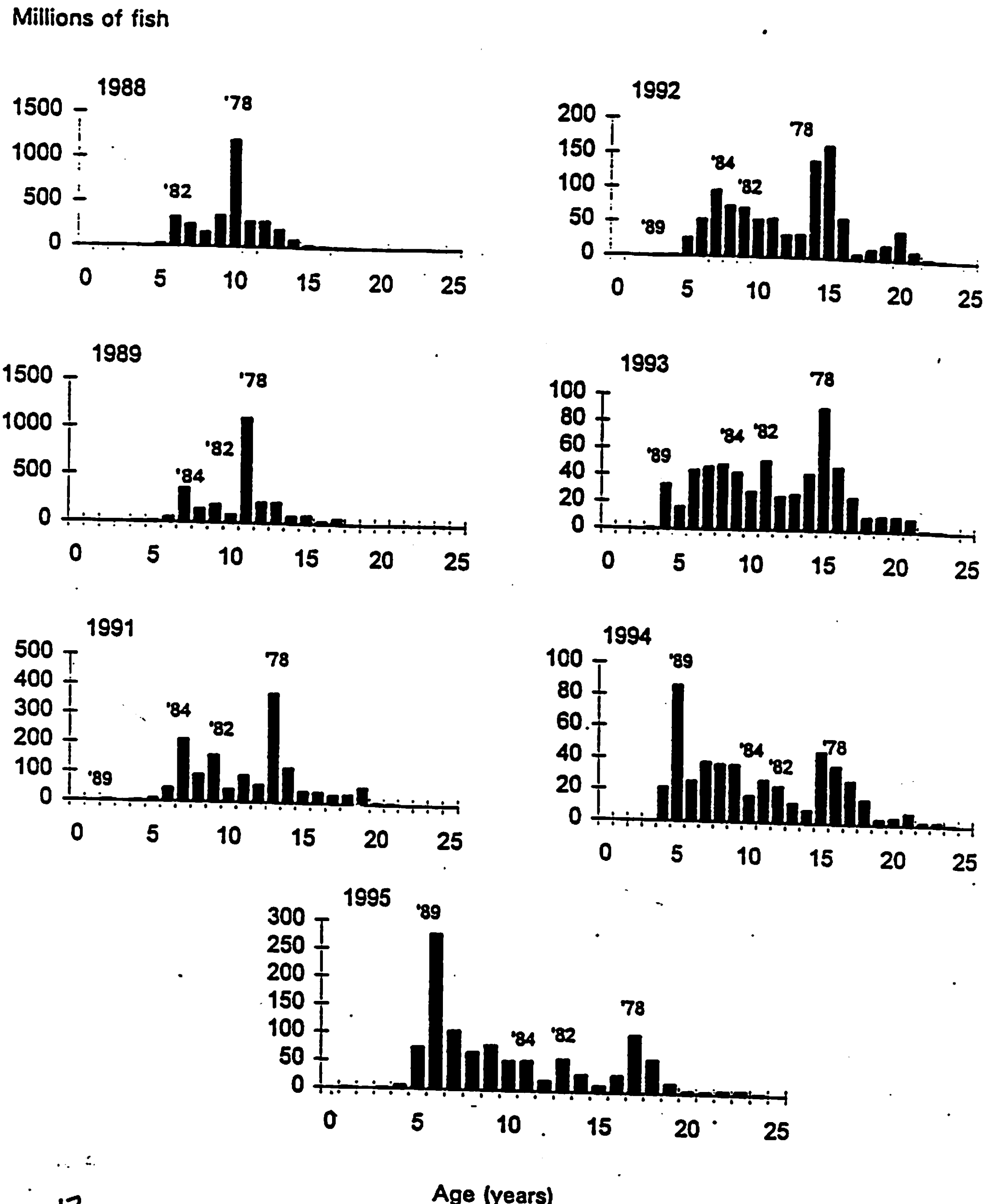


Figure 13. Population-at-age estimates obtained during echo integration-trawl surveys of spawning walleye pollock near Bogoslof Island in winter 1988-89,1991-95. Major year classes are indicated. No survey was conducted in 1990. Note y-axis scale differences.

Eastern Bering Sea Pollock Stock

Estimation of 1996 ABC at $F_{40\%}$

1992 Year Class (Billions at Age 3 in 1995)	Biomass in 1996 (Metric Tons)	1996 ABC (MT)
7.701	7.362	1.293
------	-------	------
3.247	5.981	1.092

ALEUTIAN REGION POLLOCK

1. BIOMASS ESTIMATES

Year	Survey Biomass
1980	252,000
1983	496,000
1986	448,000
1991	180,000
1994	86,400
	87,200 (Projected Biomass)

2. ABC ESTIMATION

ABC = $F_{35\%}$ * 87,200 = 26,200 mt

3. PLAN TEAM RECOMMENDATION

TAC = Bycatch only (About 3,000 mt)

4. REASONS

a. Declining Biomass
b. Some fish harvested are from Aleutian Basin stock
c. Pollock are important prey items for sea lions

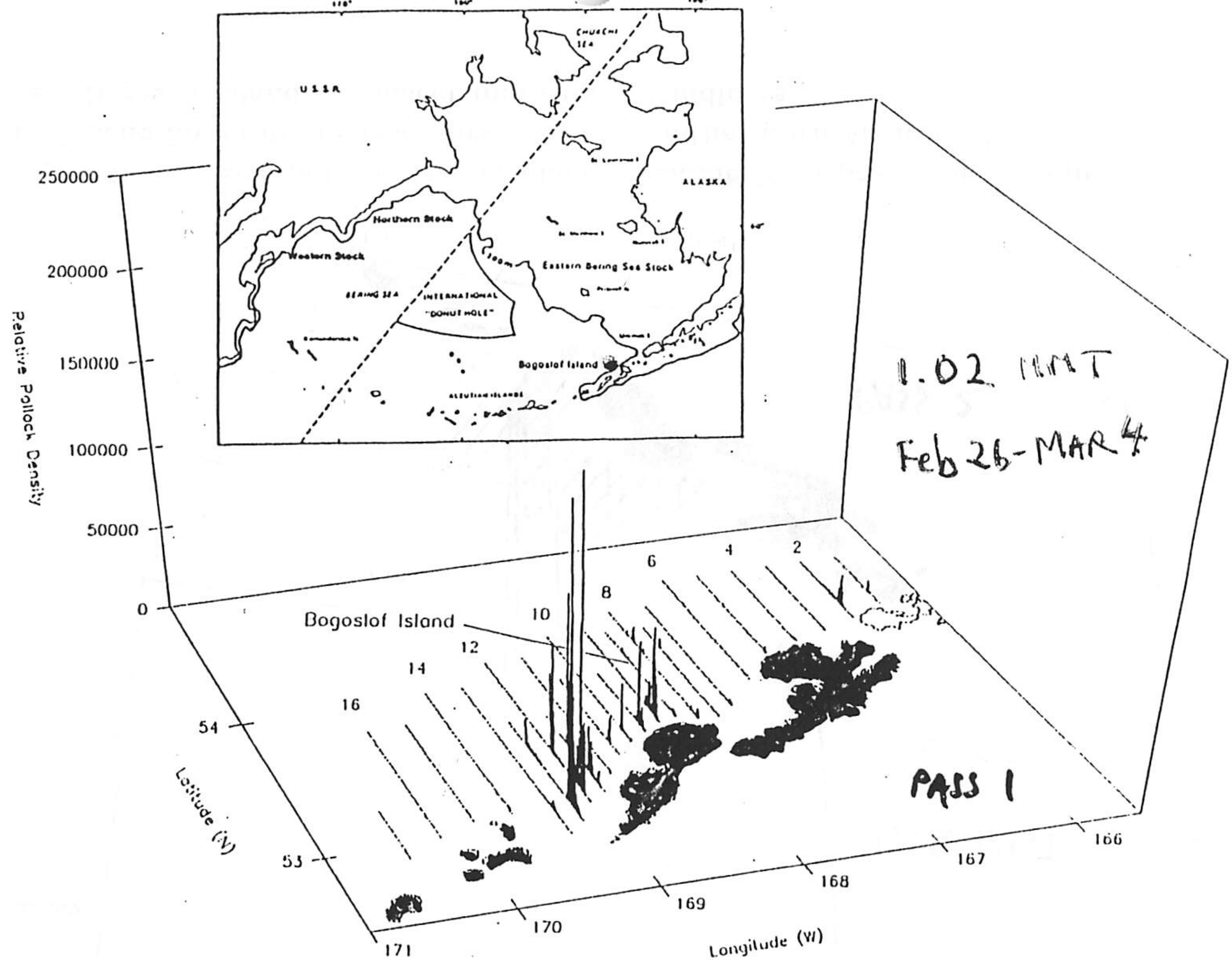


Figure 1. Relative pollock density along trackline from pass 1 of the winter 1995 echo integration–trawl survey of the southeastern Aleutian Basin near Bogoslof Island. Transect numbers are indicated.

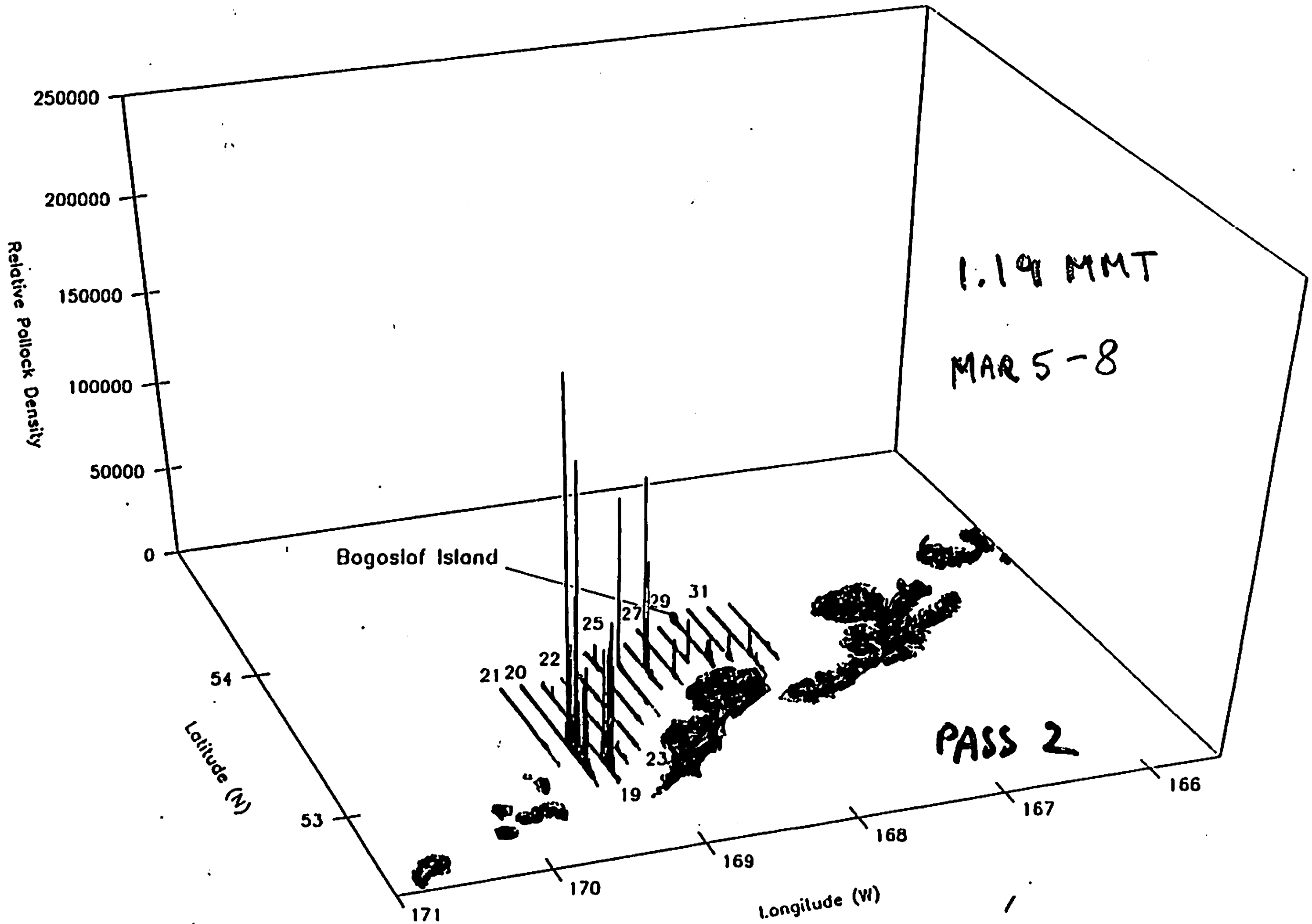
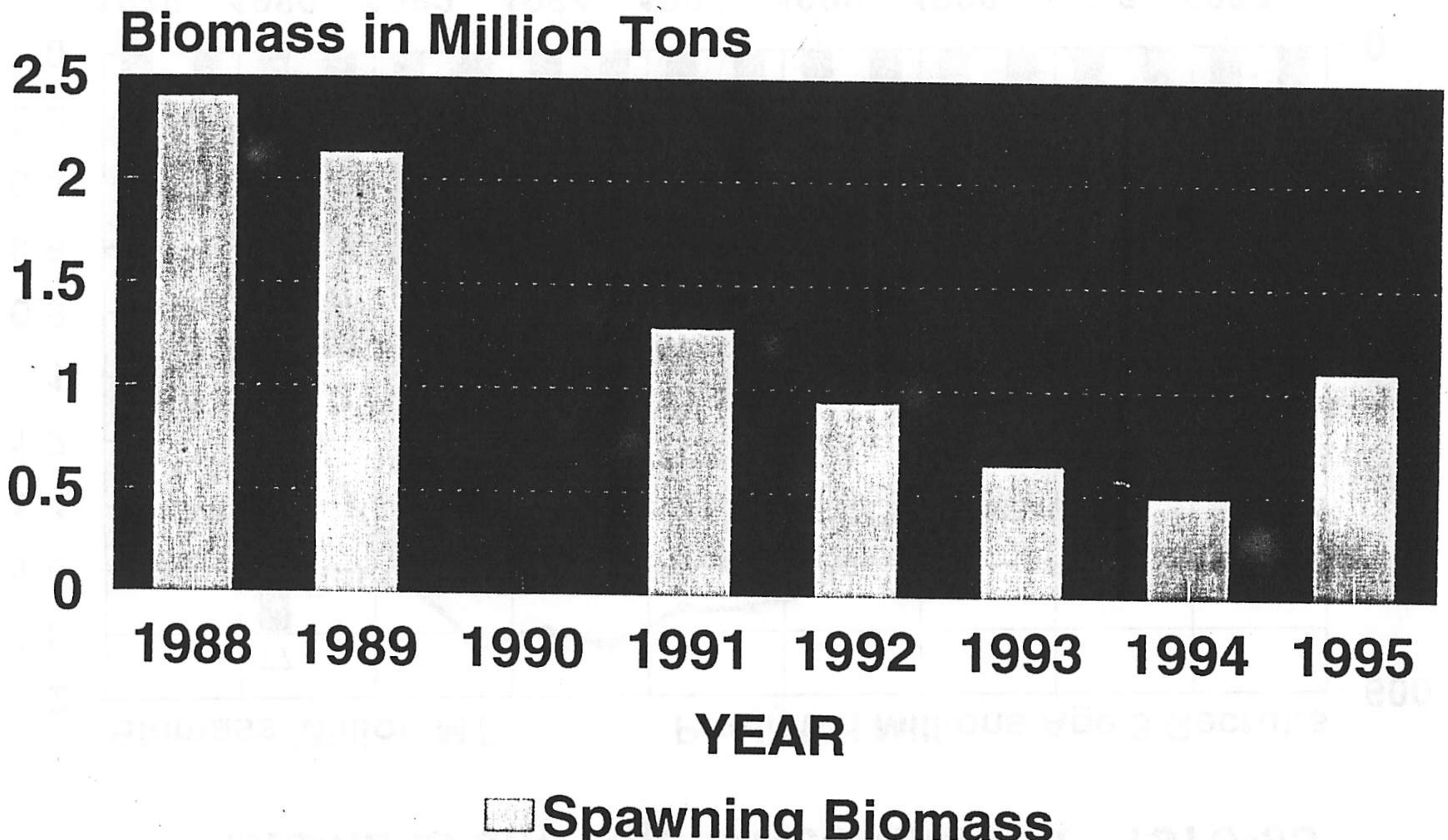


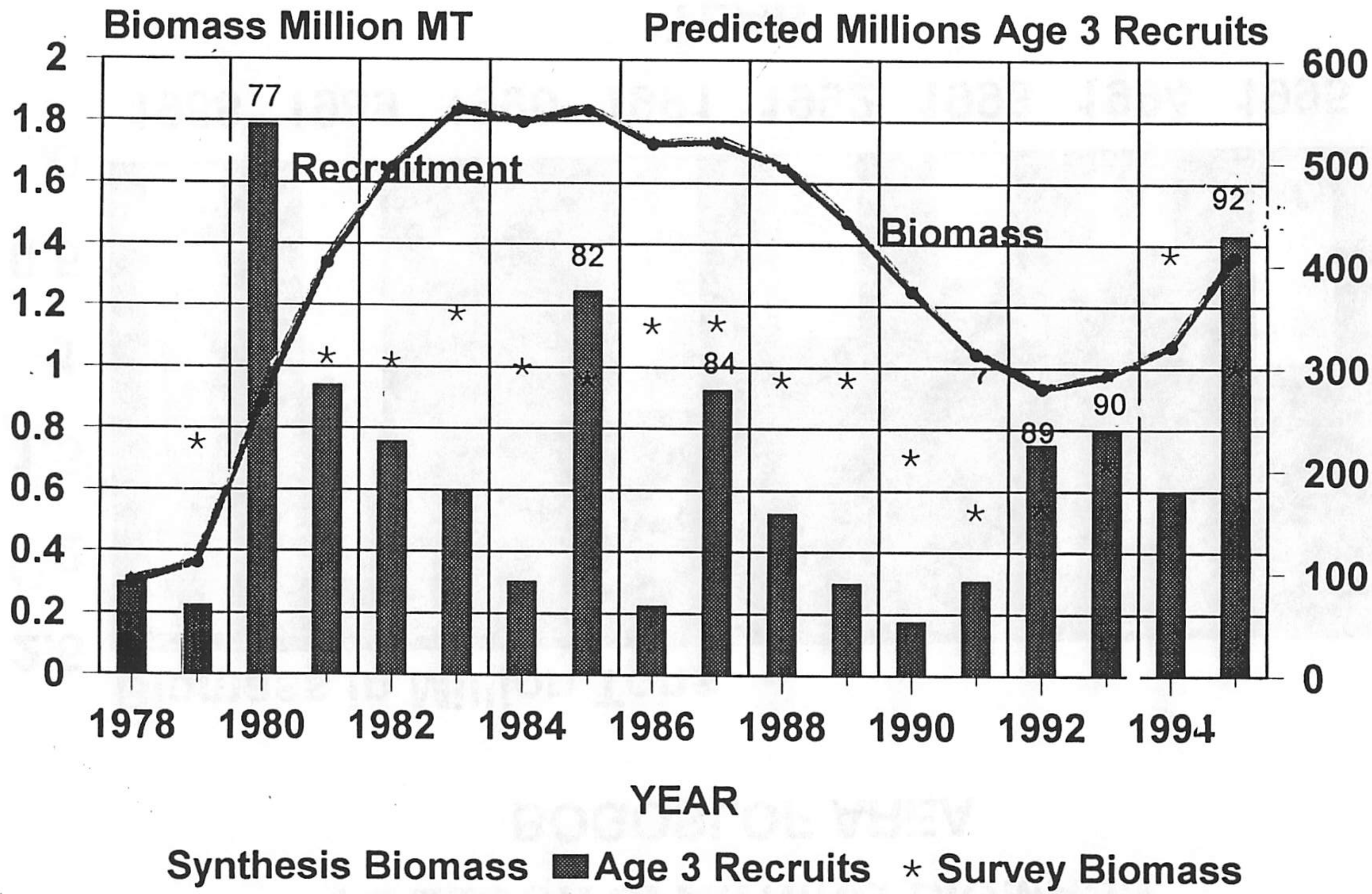
Figure 2: Relative pollock density along trackline from pass 2 of the winter 1995 echo integration–trawl survey of the southeastern Aleutian Basin near Bogoslof Island. Transect numbers are indicated.

POLLOCK SPAWNING BIOMASS
BOGOSLOF AREA



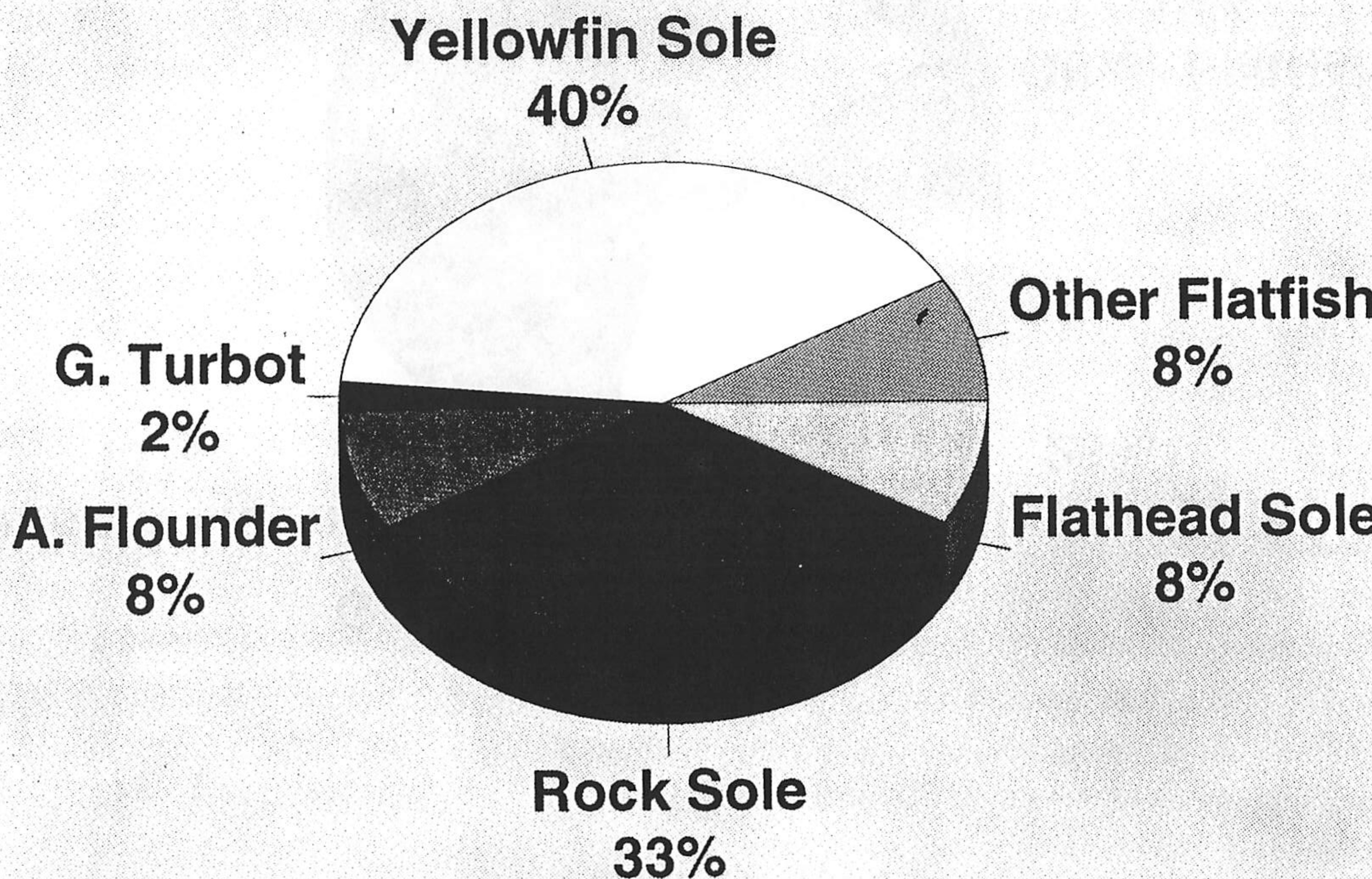
Miller Freeman Hydroacoustic Survey

Eastern Bering Sea Pacific Cod
Biomass and Age 3 Recruitment 1978-95



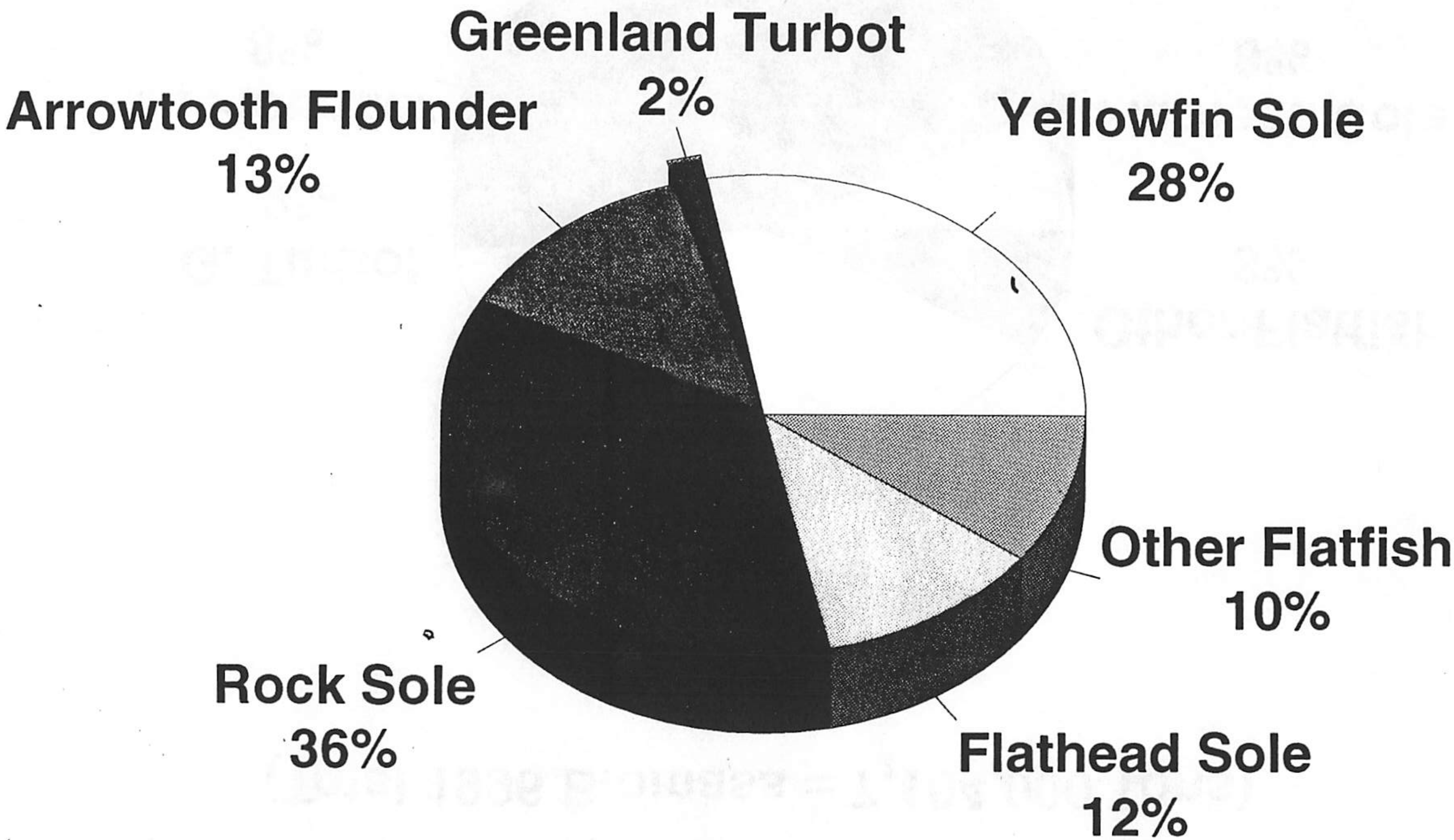
BERING SEA FLATFISH COMPLEX

(Total 1996 Biomass = 7,104,000 Tons)



1996 Flatfish ABCs

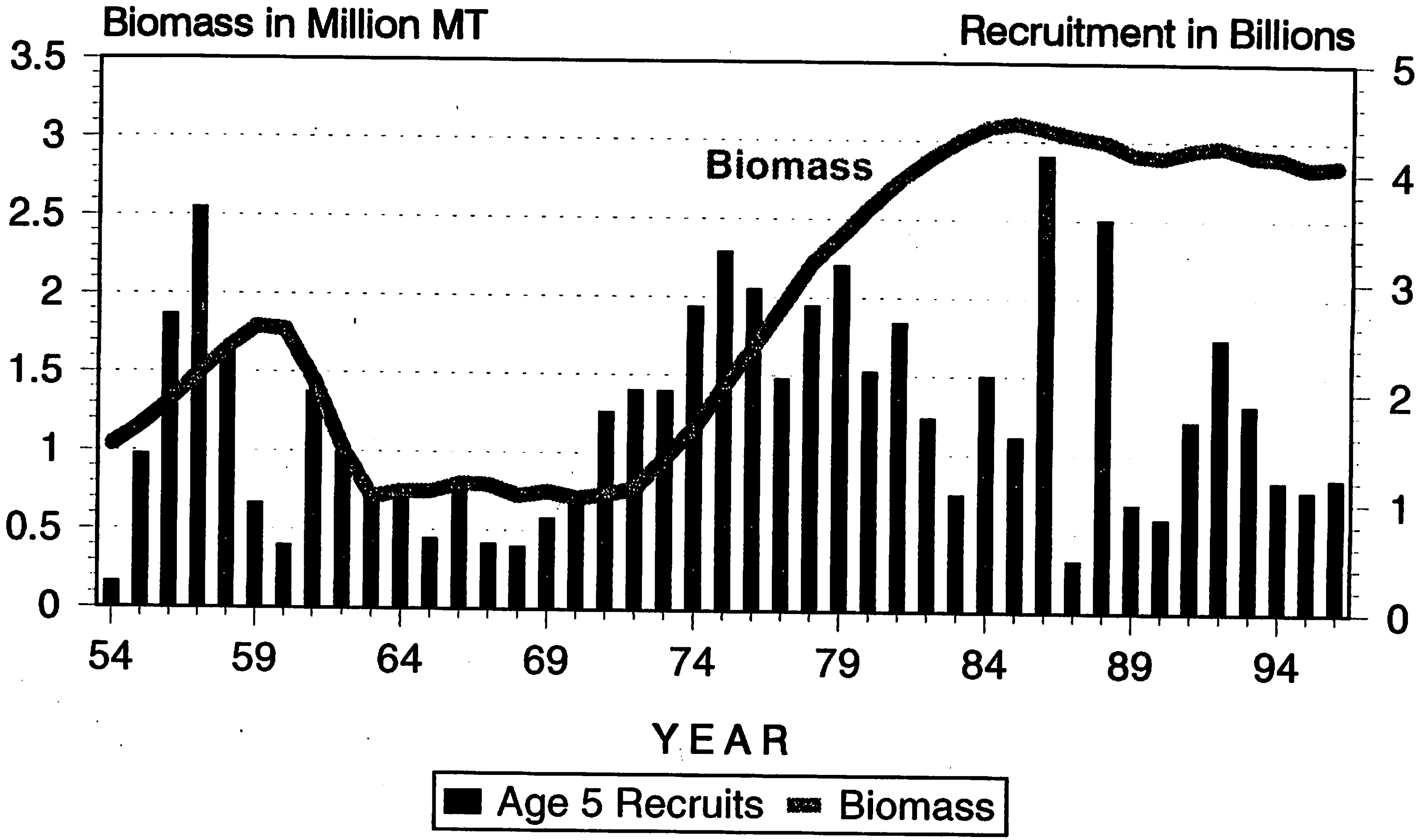
(Total ABC = 1,003,000 Metric Tons)



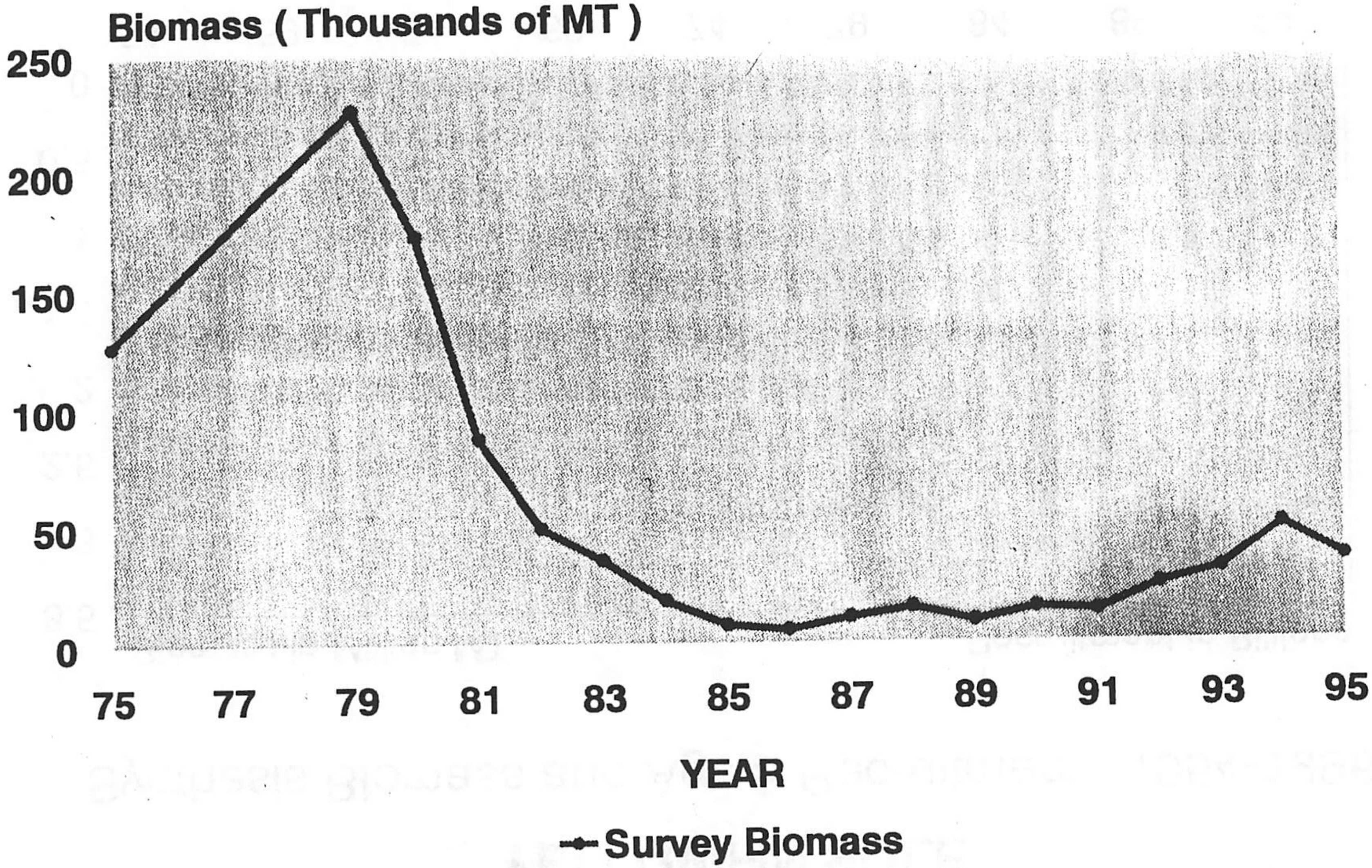
Estimated by Plan Team

YELLOWFIN SOLE

Synthesis Biomass and Age 5 Recruitment 1954-1996

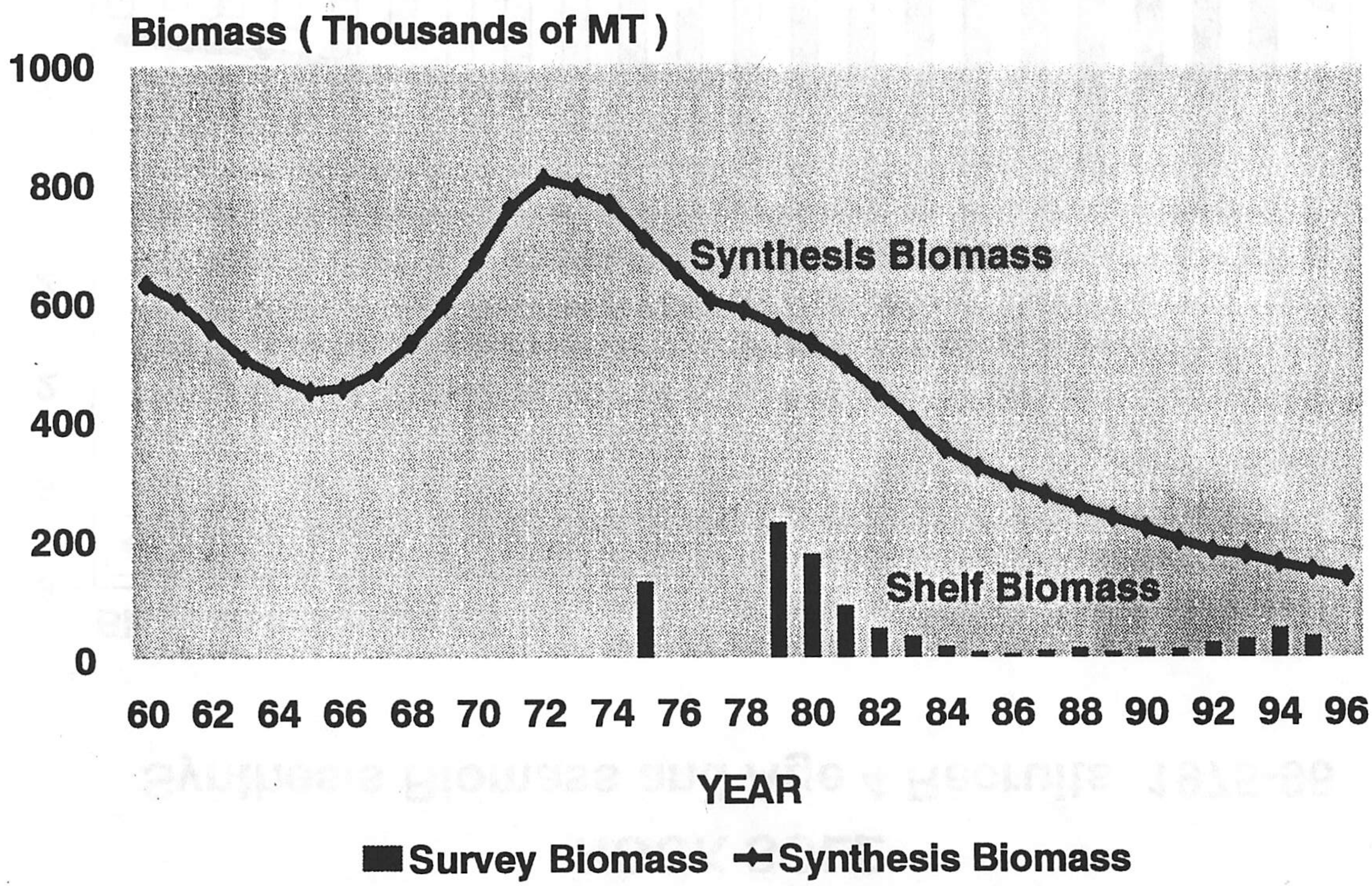


Greenland Turbot
EBS Shelf Survey Biomass 1975-95



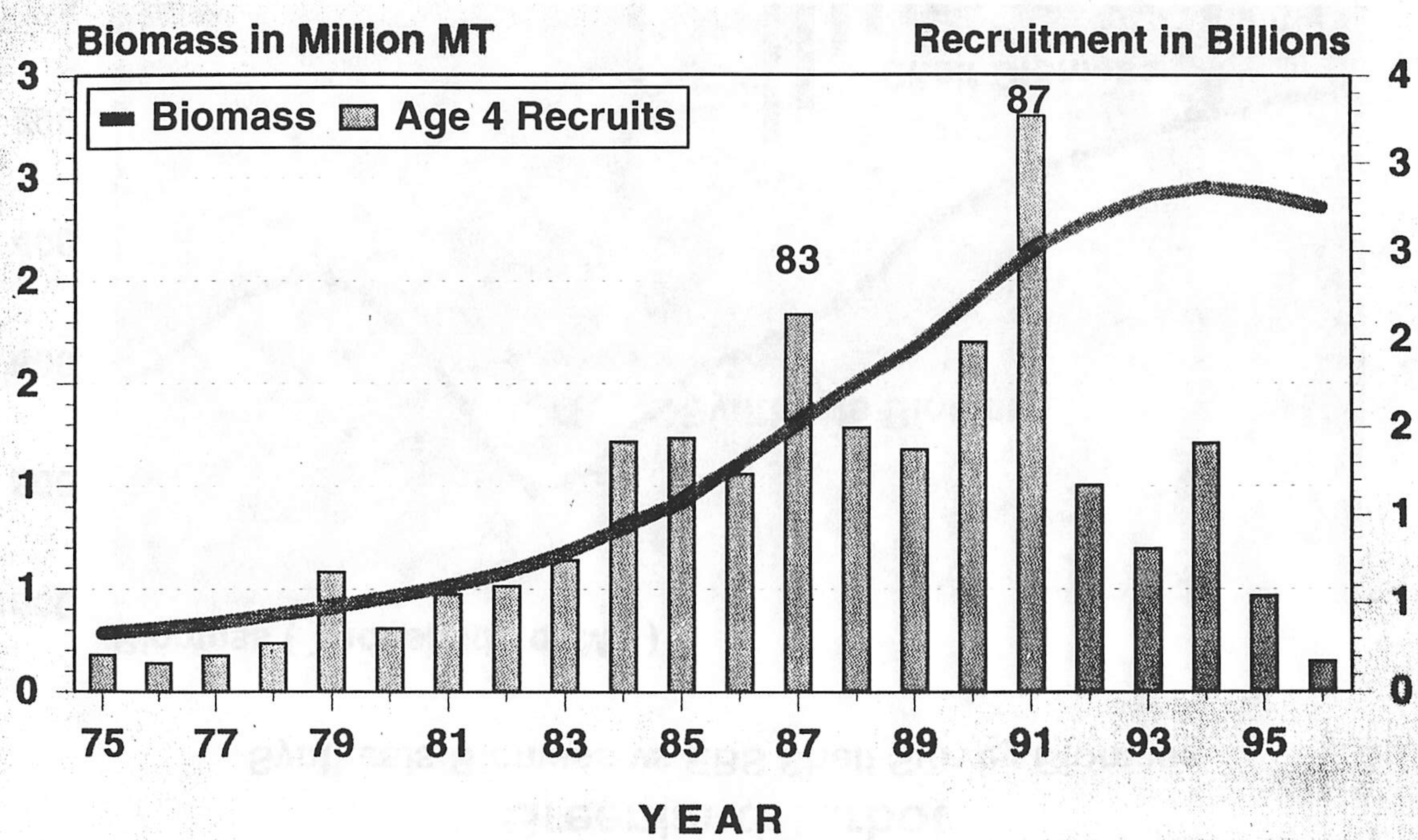
Greenland Turbot

Synthesis Biomass vs EBS Shelf Survey Biomass

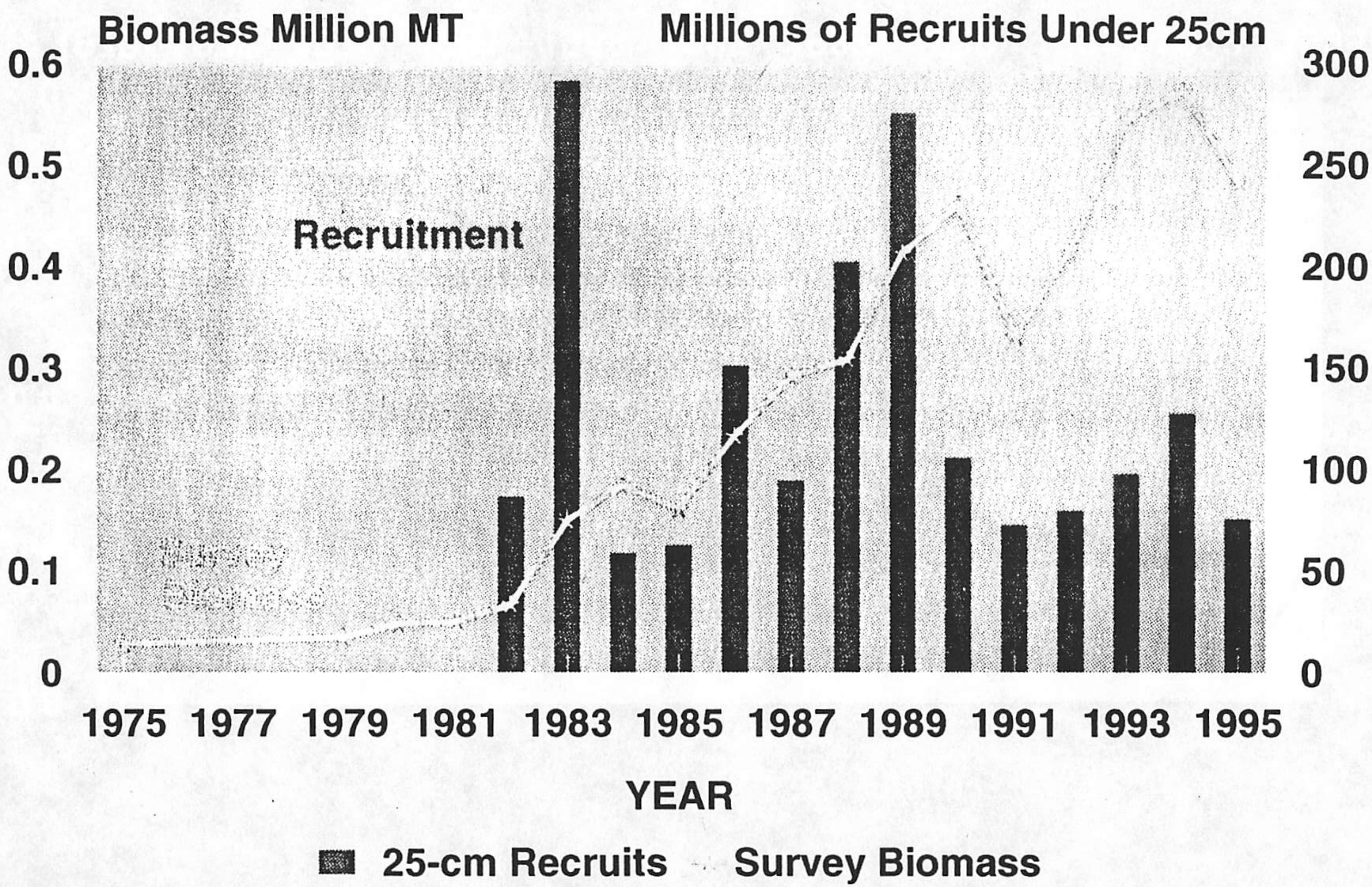


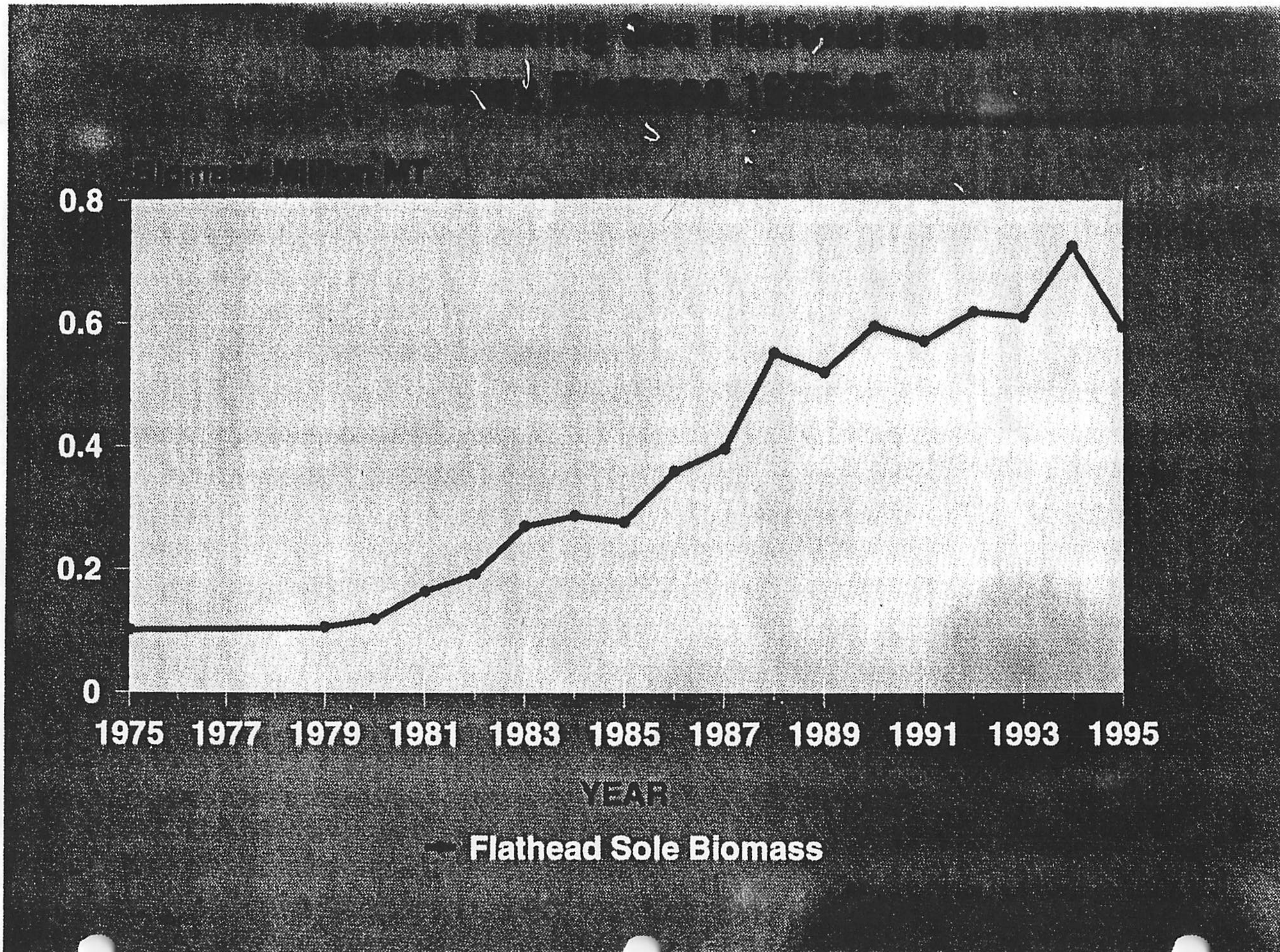
ROCK SOLE

Synthesis Biomass and Age 4 Recruits 1975-96

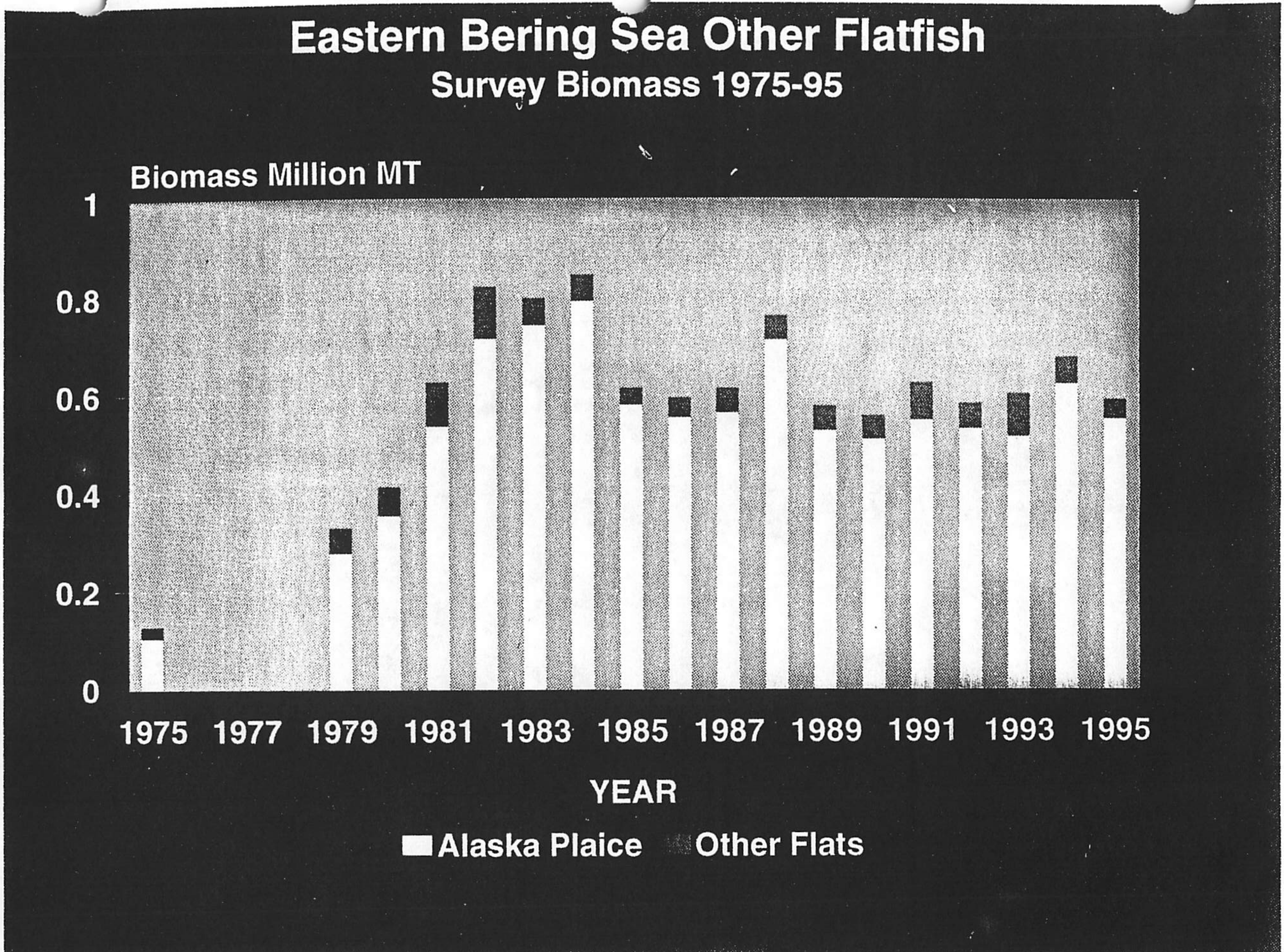


Eastern Bering Sea Arrowtooth Flounder
Biomass and Recruitment Trends 1975-95





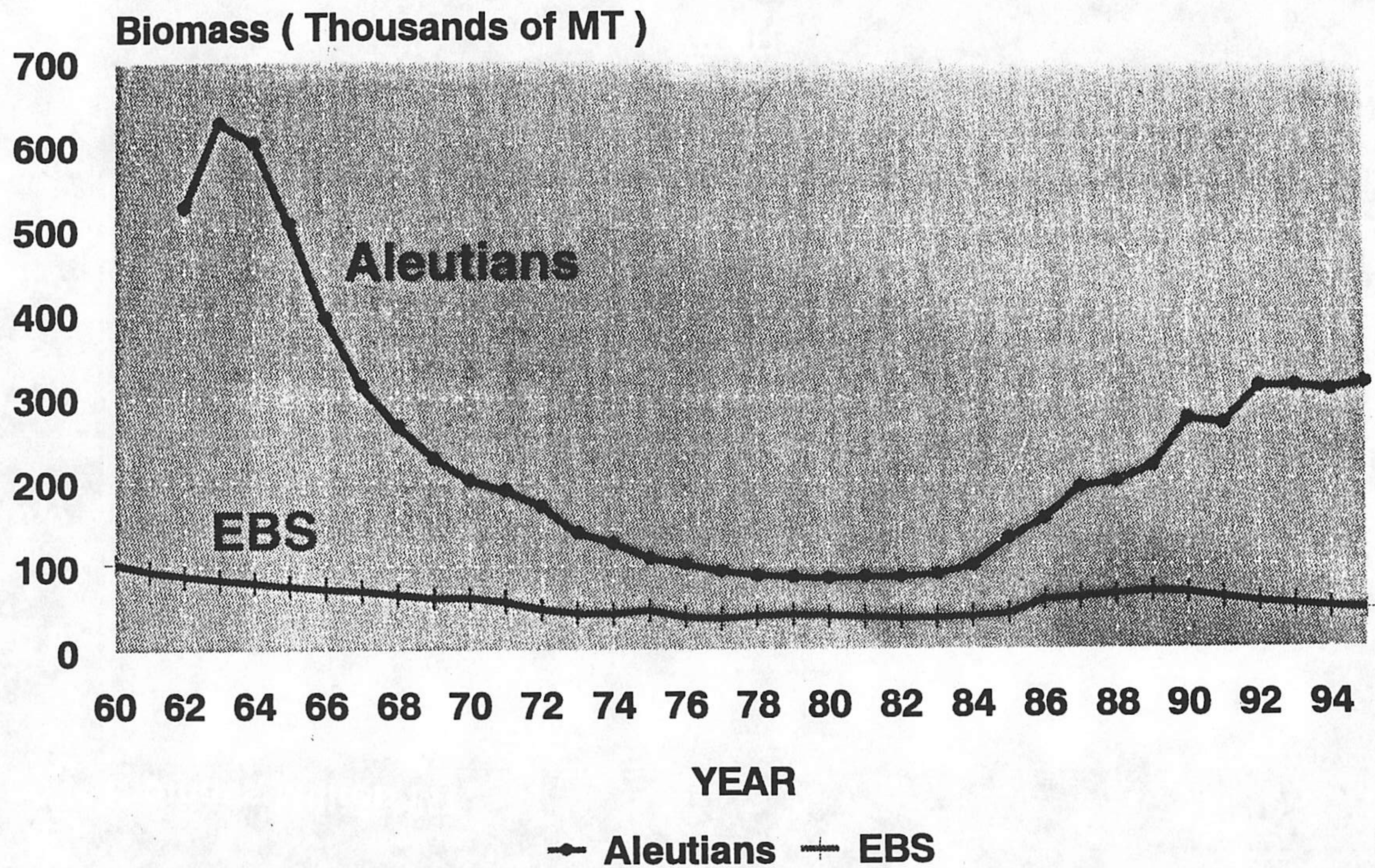
Eastern Bering Sea Flathead Sole
Survey Biomass 1975-95
Biomass Million MT
0.8
0.6
0.4
0.2
0
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
YEAR
Flathead Sole Biomass



Eastern Bering Sea Other Flatfish
Survey Biomass 1975-95
Biomass Million MT
1
0.8
0.6
0.4
0.2
0
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
YEAR
Alaska Plaice
Other Flats

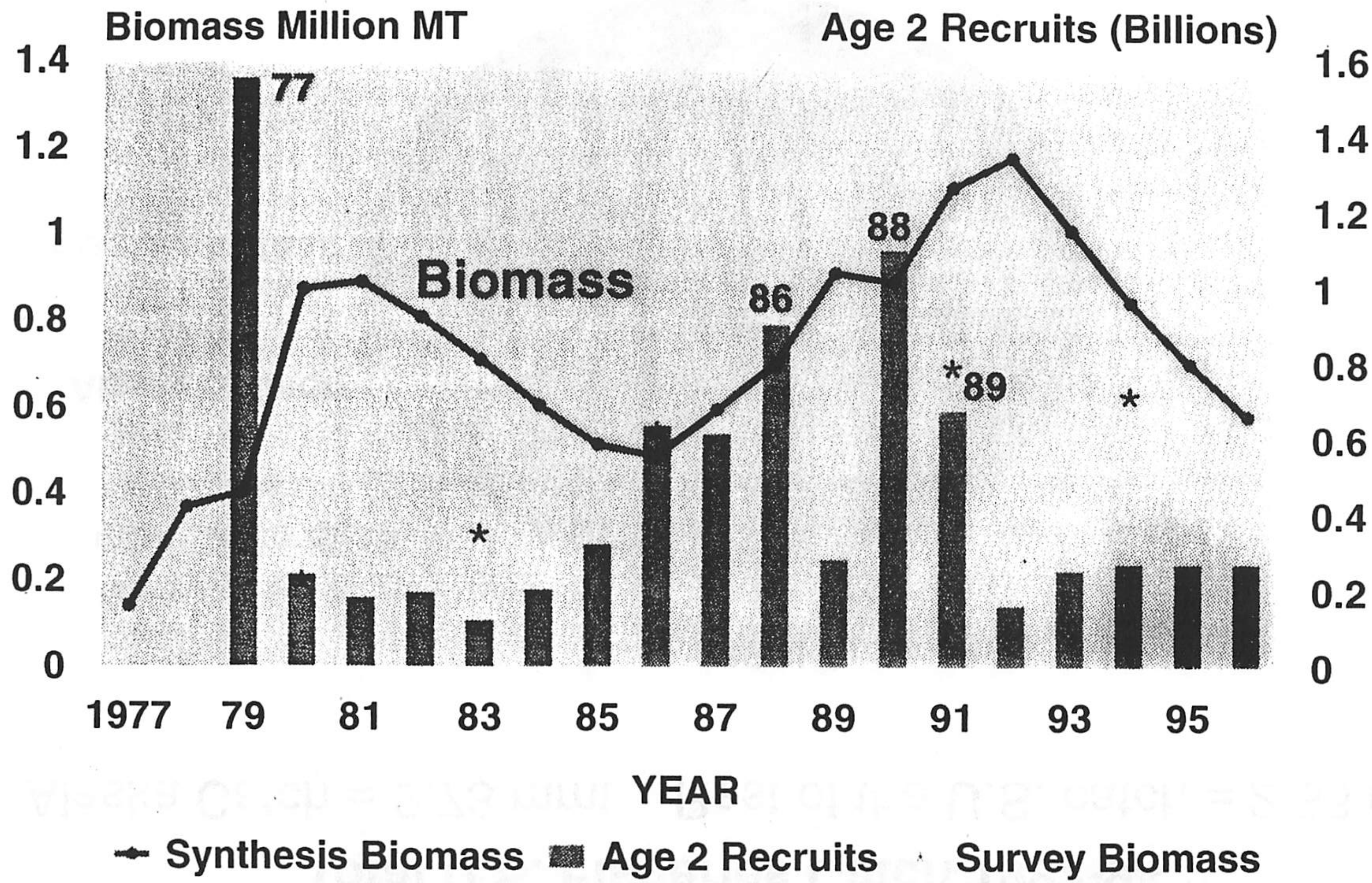
Pacific Ocean Perch

Stock Synthesis Age 9+ Biomass 1960-95



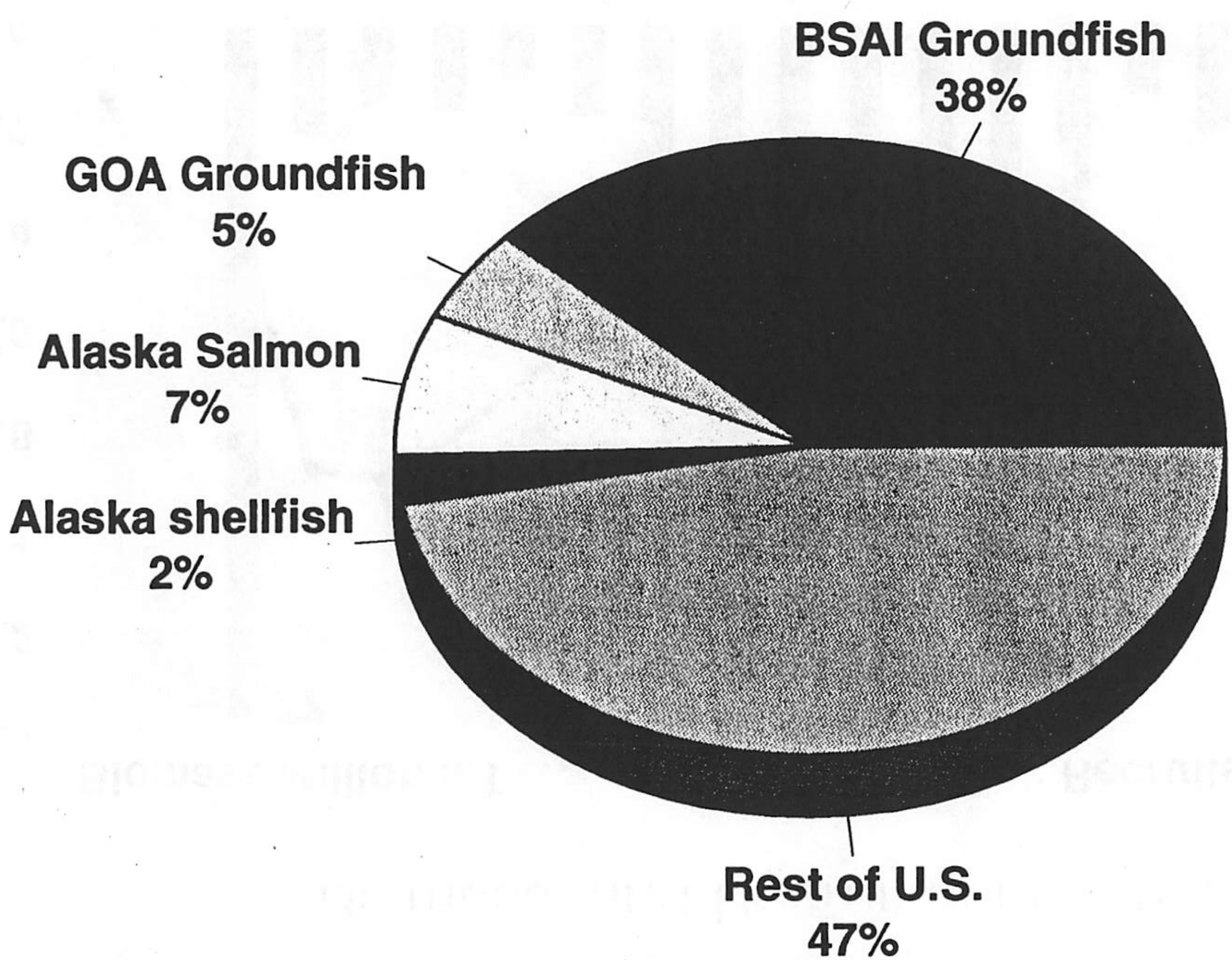
Aleutians Atka Mackerel

Biomass and Recruitment 1972-96



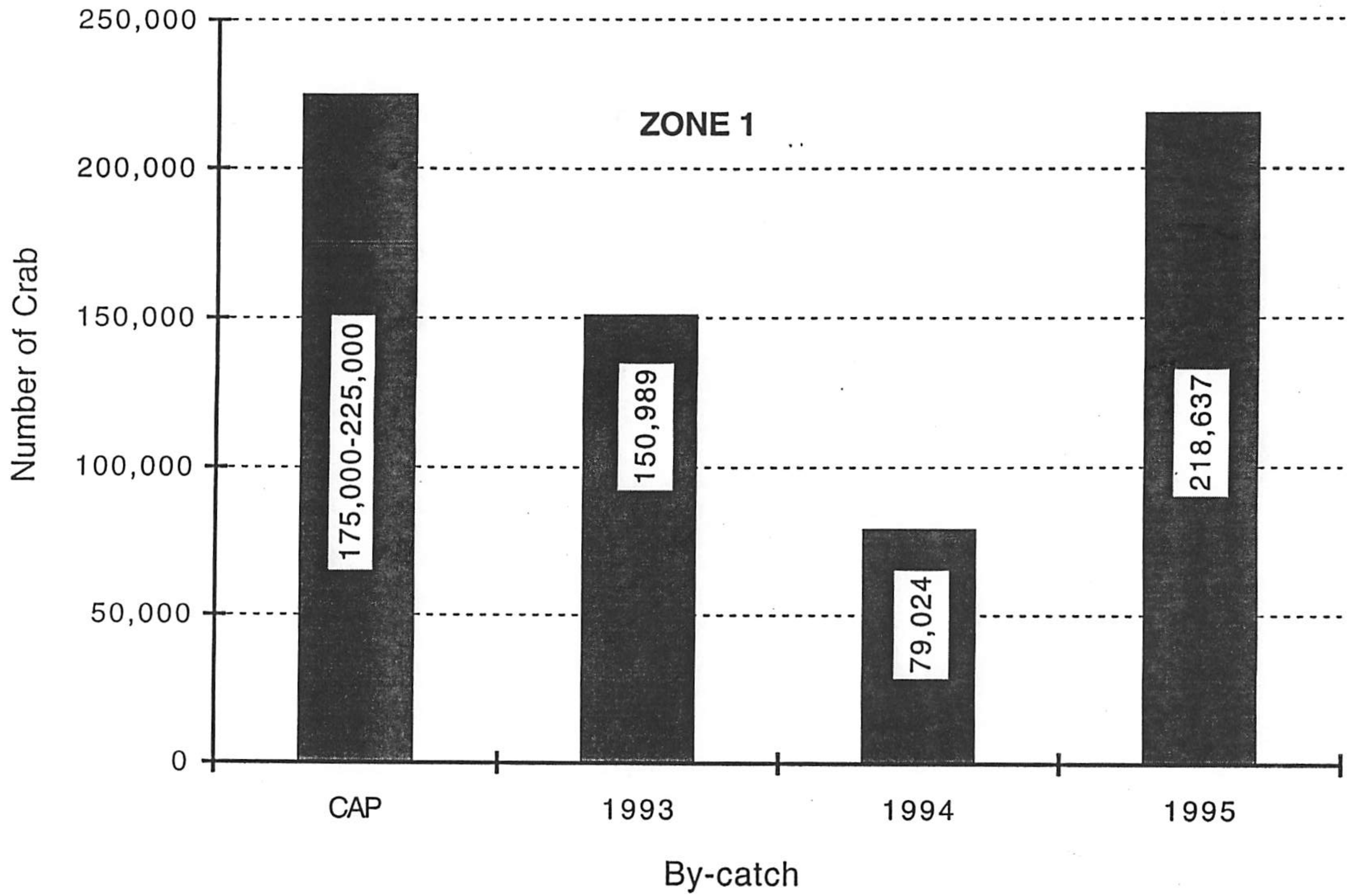
Total U.S. Fisheries Catch 1992-94

Alaska Catch = 2.73 mmt   Rest of the U.S. catch = 2.36 mmt

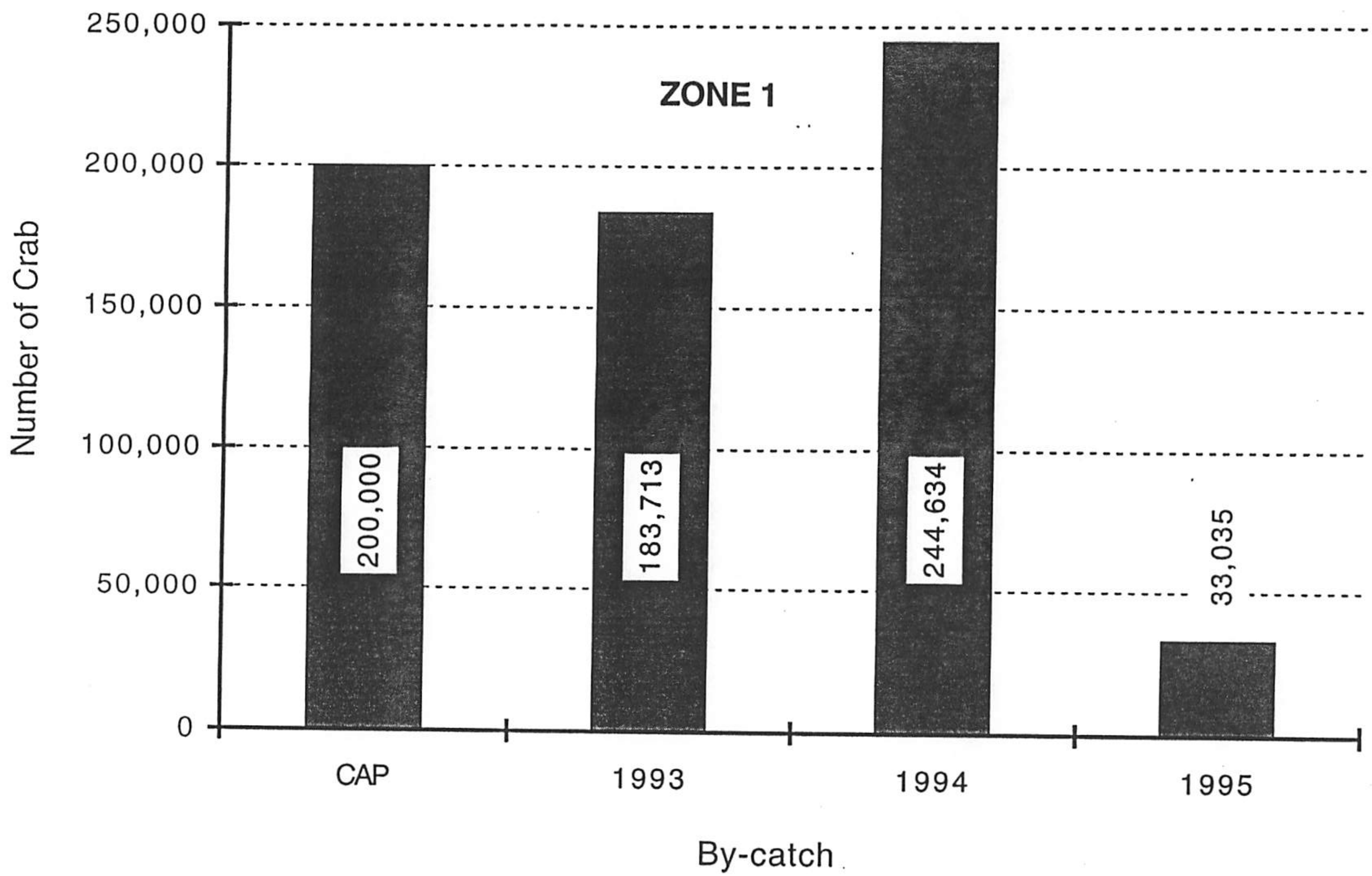


UCB D-1 Dec '95

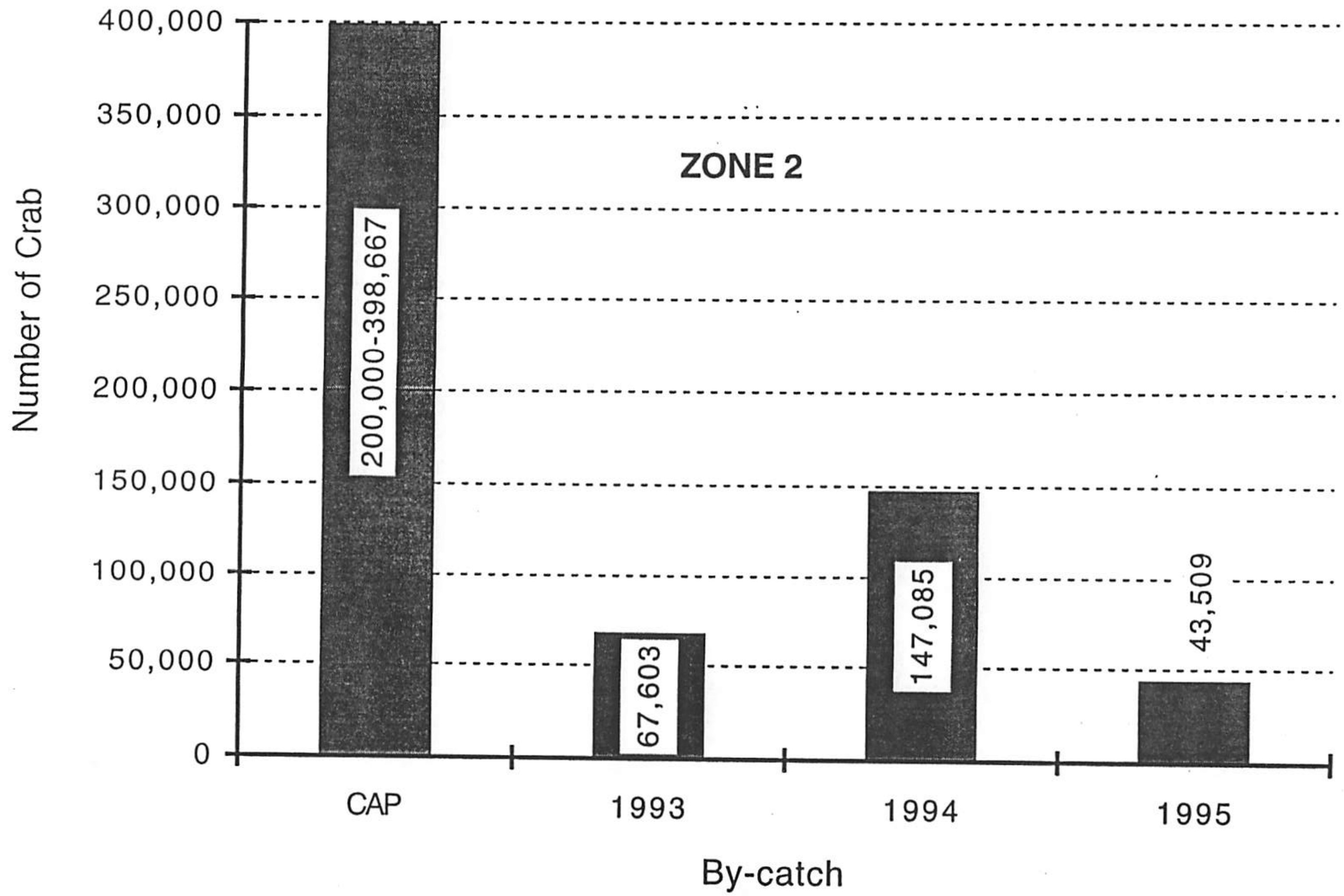
Bairdi Tanner crab by-catch in the Bering Sea cod trawl fisheries relative to cap, 1993-1995.



Bristol Bay Red King crab by-catch in the Bering Sea groundfish trawl fisheries relative to cap, 1993-1995.



Bairdi Tanner crab by-catch in the Bering Sea cod trawl fisheries relative to cap, 1993-1995.



Bairdi 1993-1995	
By-catch	CAP
151,000	175,000
67,603	398,667
79,024	175,000
147,085	200,000
218,637	225,000
43,509	260,000
706,855	1,433,667

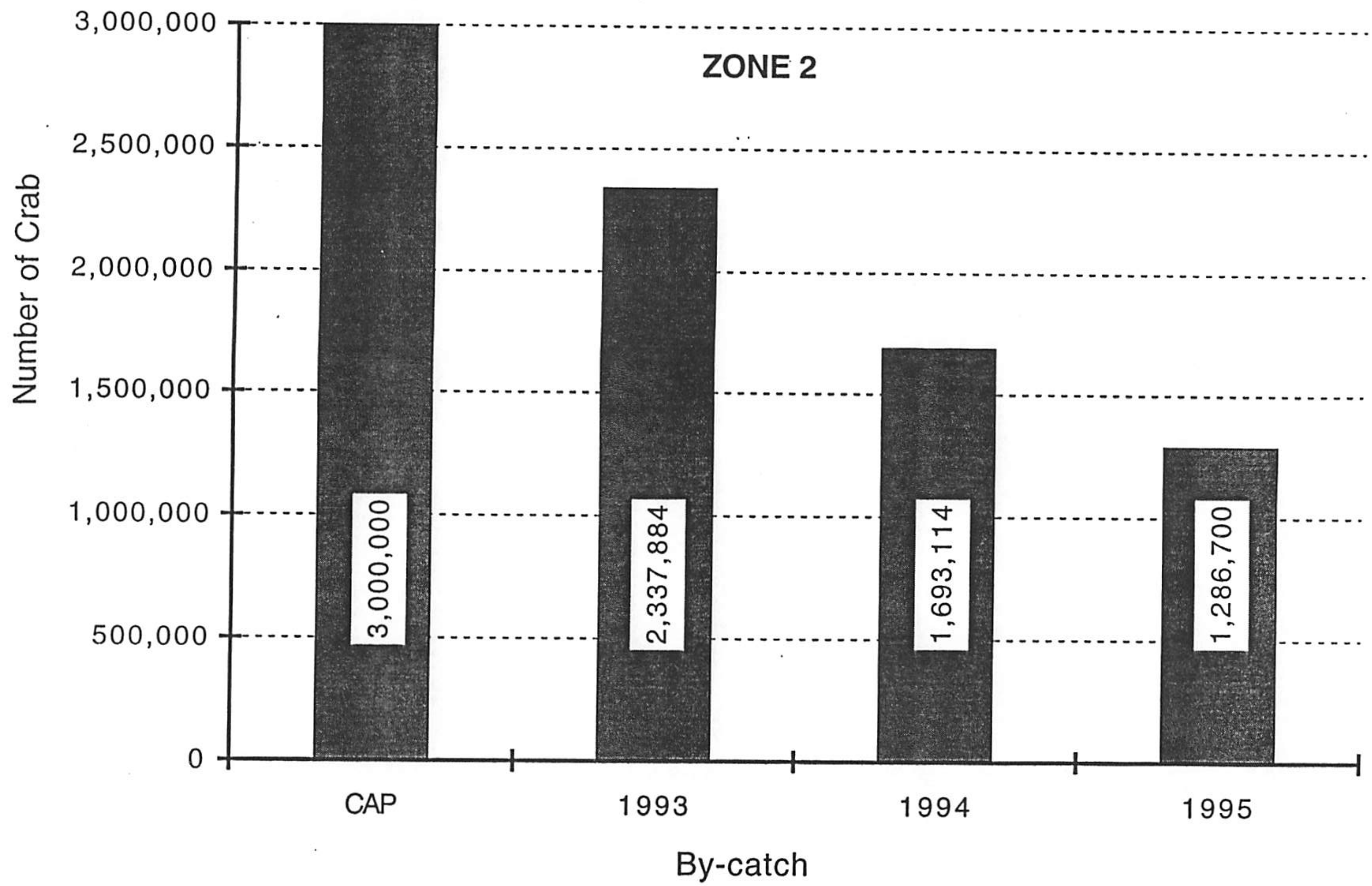
49.30%

Red King Crab 1993-1995	
By-catch	CAP
501	40,000
781	10,000
2,450	10,000
3,732	60,000

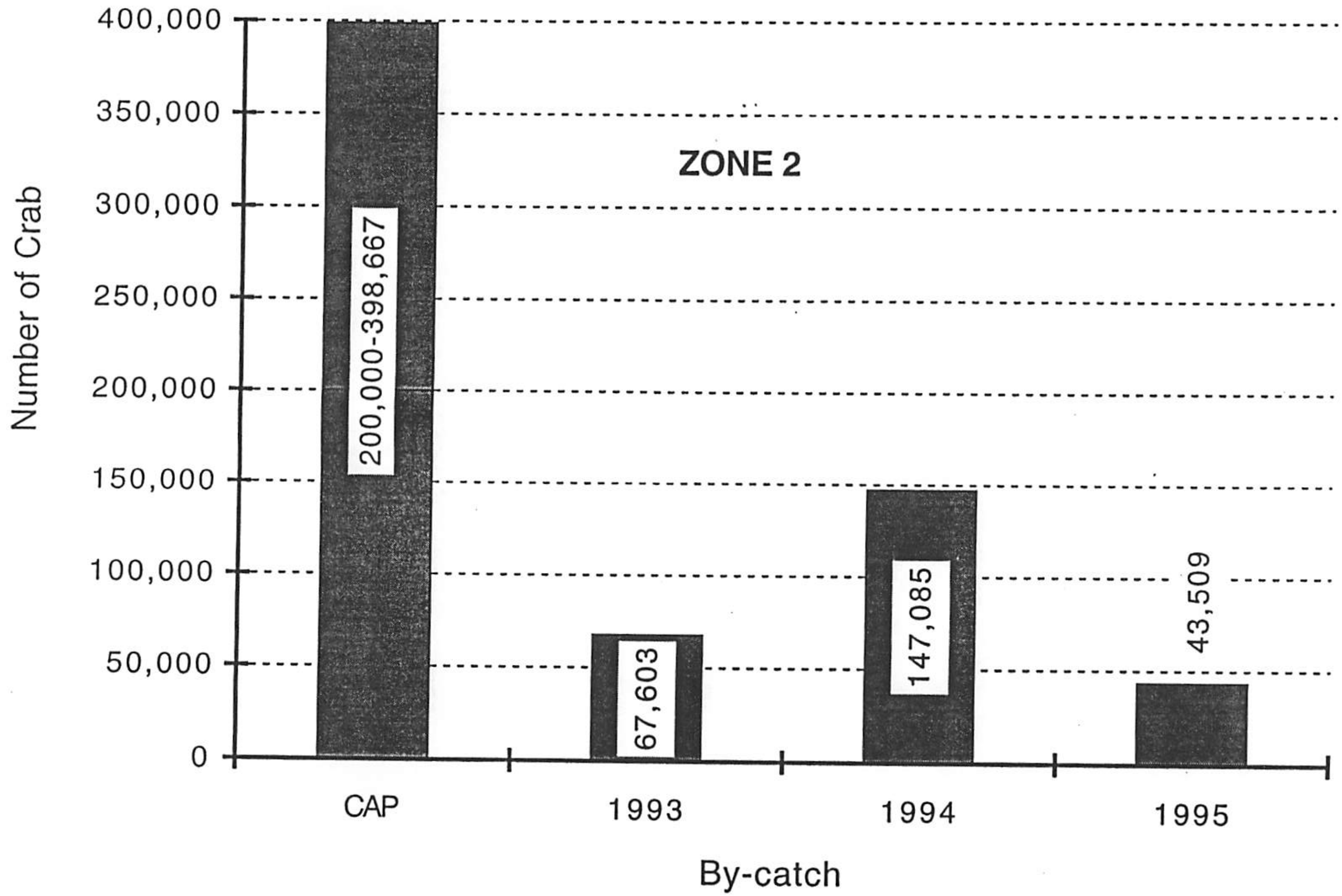
6.22%

% Crab CAPS used as by-catch in cod fisheries

Bairdi Tanner crab by-catch in Bering Sea groundfish trawl fisheries relative to cap, 1993-1995.



Bairdi Tanner crab by-catch in the Bering Sea cod trawl fisheries relative to cap, 1993-1995.



Bairdi Tanner crab by-catch in Bering Sea groundfish trawl fisheries relative to cap, 1993-1995.

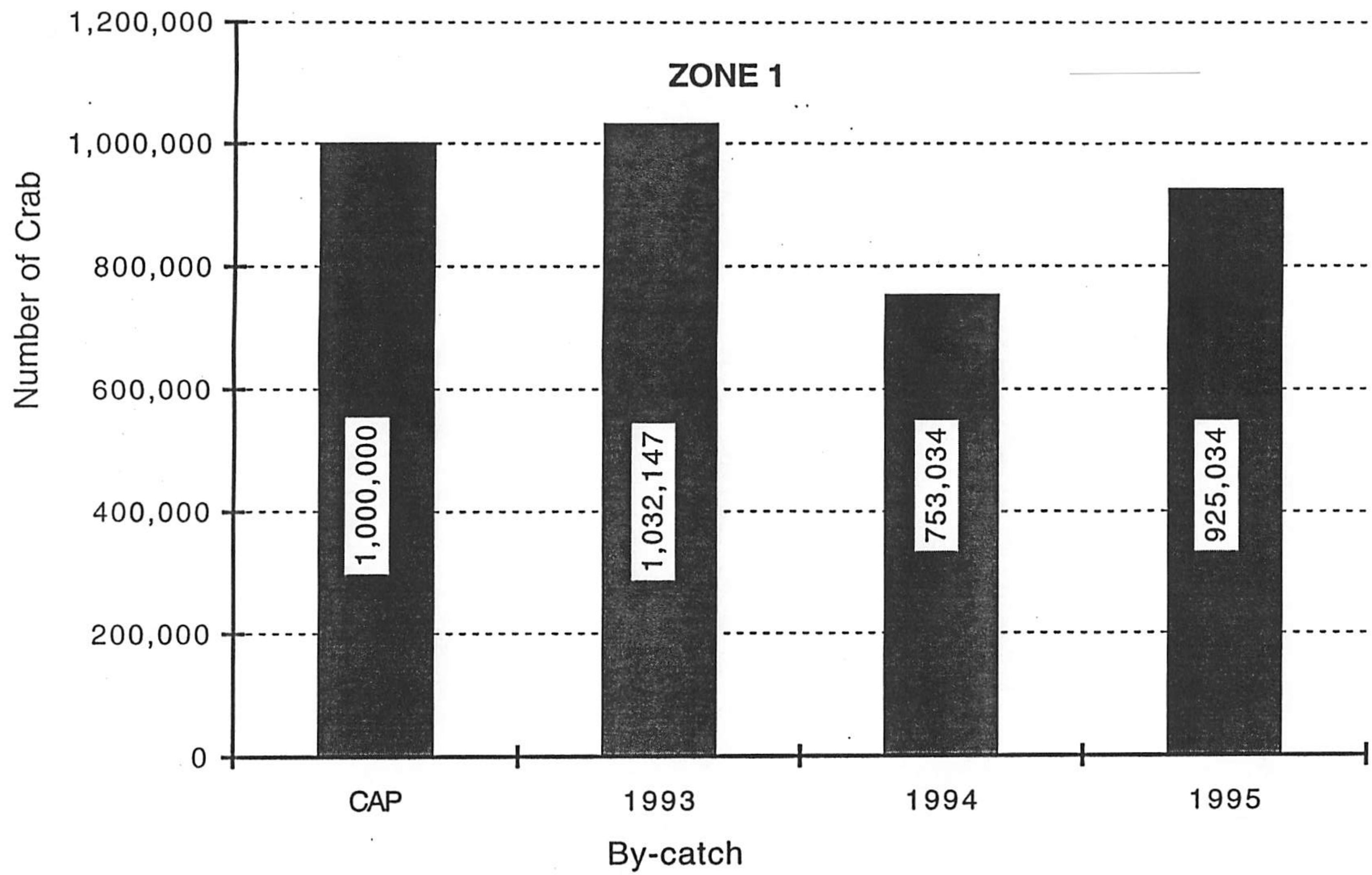


Table 2

Initial 1996 BSAI Trawl Fisheries PSC Apportionments and Seasonal Allowances

Fishery Group	Halibut Mortality Cap (mt)	Herring (mt)	Red King Crab (animals) Zone 1	C. bairdi Zone 1	C. bairdi Zone 2
Yellowfin sole	790	315	50,000	225,000	1,525,000
January 20 - August 2	750 295				
August 3 - December 31	495				
Rocksole/other flatfish	730		110,000	475,000	510,000
January 20 - March 29	690 453				
March 30 - June 28	190				
June 29 - December 31	87				
Turbot/sablefish/ Arrowtooth	0				5,000
Rockfish	110	8			10,000
Jan. 1 - Mar. 29	30				
Mar. 30 - June 28	60				
June 29 - Dec. 31	20				
Pacific cod	1,590	24	10,000	225,000	260,000
January 20 - June 28	1,450 1,487				
June 29 - December 31	103				
Pollockmackerel/o.species	555	169	30,000	75,000	690,000
January 20 - April 15	555 455				
April 16 - December 31	100				
Pelagic Trawl Pollock		1,345			
TOTAL	3,375	1,861	200,000	1,000,000	3,000,000

Initial 1996 Recommendations for Non-Trawl PSC Bycatch Allowances

Fishery Group	Halibut Mortality (mt)	Seasonal Apportion (mt)
Pacific Cod	725	
Jan 1 - April 30		475
May 1 - August 31		40
Sept. 1 - Dec. 31		210
Other Non-Trawl*	175	
Groundfish Pot	Exempt	
TOTAL	900	

* Includes Hook & Line sablefish, rockfish, and Greenland turbot, respectively.

November 28, 1995

Mr. Steve Pennoyer
Regional Director
NMFS- F/AKR
P.O. Box 21668
Juneau, AK 99802

Dear Mr. Pennoyer:

We have been informed that at the December NPFMC meeting, NMFS intends to show a preliminary version of a research video that attempts to evaluate the effects of different trawl gears on crabs. Some representatives of the trawl industry had the opportunity to view the video last week in Seattle. We are concerned about the potential misuse of this video unless it incorporates the appropriate explanation and disclaimers. The fishing practices depicted in the video are not representative of how trawling is conducted in the Bering Sea fisheries which the video may be construed to describe.

Of particular concern is the footage showing some adult king crab being injured by "tire gear" -- a gear that is not used in flat or mud bottom areas- the areas inhabited by crabs. The trawl industry feels it should not be put in a position to defend a gear that it does not use in the fishing situation (flatfish target) depicted in the video. As such, the "tire gear" segment is misleading and unnecessarily inflammatory given the tension between crabbers and trawlers and serves no constructive purpose.

Another potentially misleading aspect of this video is that it was conducted in an area with relatively high adult king crab populations. In fact, had the research vessel operated under the Vessel Incentive Program, as our commercial vessels do, it would have had extraordinarily high bycatch rates and been subject to legal sanctions. Furthermore, the video was edited down from 80 hours to about 20 minutes to specifically highlight encounters with crab. This could impart a false impression of the amount of crab actually encountered in commercial trawls.

We feel, Mr. Pennoyer, that portions of the video can do little but anger crab fishermen upset by the closing of the Bristol Bay red king crab fishery and could jeopardize ongoing efforts to work with the crab industry to rebuild king crab stocks. Trawlers have agreed to close large areas in the Bering Sea known to be critical to king crab populations and voluntarily implemented a crab avoidance program with Sea State this past year. In the end, we hope that the spirit of cooperation will not be fractured by a video that sheds no light on the effects of realistic fishing practices on crab populations.

To help avoid potential damage to our relationship with the crab industry, we offer the following suggestions. Until adequate disclaimers are incorporated into the video, we ask that the video be available for viewing only. In addition, at all of the showings, NMFS officials should present a preamble explaining that the video was edited to focus on crab interactions, that the experimental trawling was intentionally conducted to maximize crab interactions, and that the trawl industry has indicated that "tire gear" is not a gear that is used in a flatfish target (the target fishery that the video attempts to simulate).

Further, it should be pointed out that there is evidence that "tire gear" is inferior to other gears used in the experiment- which supports the industry's explanation for why the gear is not used, and that trawlers have pointed out that the infiltration of mud and sediment from "tire gear" adversely impacts the marketability of product caught with that gear.

The industry feels the above points should also be included in the disclaimers that are developed for the video. Disclaimers should be incorporated into the video in a way that makes them inseparable from the video and impossible to ignore.

We further request NMFS to consider presenting a portion of the video in unedited form-so that the audience can evaluate the effects of editing on the content and emphasis of the video. Perhaps approximately twenty minutes of unedited tape should be randomly selected to balance the presentation and illustrate the effects of editing.

In addition, the trawl industry was told by Craig Rose, NMFS researcher who developed the video, that a large number of derelict crab pots were encountered during the experiment. None of that footage appears in the video presented to the industry. The trawl industry would like NMFS to consider making a version of the video that focuses on crab pots to see if there is evidence of ghost fishing, to evaluate the condition of the pots, and if possible, to illustrate how frequently crab pots appeared in the trawl tracks that were used in the research.

Thanks in advance for your consideration of our thoughts. We look forward to working with you and your staff on this matter to remove, to the greatest extent possible, the potential for this video to be used for misinformation purposes.

Sincerely,

(see attached signature page)

cc Lauber, Aron

American Factory Trawler Association

United Catcherboat Association

Dave Benson
Tyson Seafood Group

Alaska Groundfish Data Bank

INTERNATIONAL PACIFIC HALIBUT COMMISSION

ESTABLISHED BY A CONVENTION BETWEEN CANADA
AND THE UNITED STATES OF AMERICA

DIRECTOR
DONALD A. MCCAUGHRAN

P.O. BOX 95009
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MEMO

To: Steve Pennoyer **Date:** 12/06/95

From: Don McCaughran RJT/for

Subj: Response to Paul Seaton's testimony to the NPFMC, 12/06/95

The staff of the International Pacific Halibut Commission briefly reviewed Paul Seaton's testimony that claims over-exploitation of the halibut resource by the IPHC. Mr. Seaton's testimony selectively takes out of context statements and data from IPHC reports and memos. The selected statements were chosen to cast the halibut management in the worst possible light, but ignored other relevant information. The staff believes that Pacific halibut are not analogous to Atlantic cod, and that the halibut resource is not facing a collapse. The IPHC has a long history of conservative management that has helped maintain a viable fishery for over 100 years.

The June 12, 1995 memo from Ana Parma to Don McCaughran that Mr. Seaton attached to his testimony lays out the best summary of information relating to Mr. Seaton's allegations. Dr. Parma's memo explains the consistent improvements to stock assessment ongoing at the IPHC, the effect on stock assessment and recruitment estimates of changing size at age, and the characteristics of the CEY strategy currently in place. Nothing in the memo suggests a resource crisis with the halibut resource.

Some technical points are worth emphasizing:

(1) Paul Seaton asks: "why are we using a non-conservative CEY strategy designed for record population levels?

The CEY strategy is conservative if the target exploitation rate is. The IPHC CEY strategy WAS NOT designed for record population levels. Instead, the target harvest rate was evaluated based on historical trends in stock productivity, which include periods of high and low productivity. The analysis conducted in 1992, when the performance of alternative harvest rates were last evaluated, indicated that a 30% target resulted in high average catches and moderate-to-low probabilities that the spawning stock dropped below the historical minimum.

(2) 30% harvest rate refers to fully vulnerable fish. For total biomass of 8-20 years old this corresponds to a total rate below 15%.

(3) Answer to question (5) indicates that the drastic decline in recruitment estimated in the assessment of 1994 for recent years may in part reflect a bias caused by the reduction observed in halibut size at age, which has likely reduced the vulnerability of the young age classes. The staff has developed an alternative assessment model to address this problem, which takes into account such changes in vulnerability. The target harvest rate and size limit will be re-evaluated in 1996 using this new model. The probability that the spawning stock will fall below some threshold levels will be re-estimated for a range of harvest rates as part of that analysis. This will provide more adequate bases to judge the adequacy of alternative harvest rates.

(4) Smallest observed spawning biomasses have produced largest observed recruitments, so there is no indication that the stock was overfished at those minimum levels.

(5) Mr. Seaton claims that "This fishery is in a management induced decline."
The present decline in biomass from record high levels in the late 1980s is due to lower recruitment and lower growth in recent years. Record high biomass levels cannot be maintained, and the high biomass levels did not result in higher productivity.

(6) The staff agrees that CPUE may be inflated in recent years due to advances in technology (other than the change to circle hooks, which is already accounted for). However, standardized scientific surveys conducted in some of the areas show comparable trends. The biomass decline estimated in the assessment of 1994 conflicts with these trends, which again points to possible bias in that assessment caused by changes in vulnerability. The staff is currently examining these questions.

D-1
Dec 95

Paul Seaton's Testimony for The Alaska Marine Conservation Council

I would like to address the 1995 stock assessment for halibut contained in your SAFE document. I realize you do not usually address in detail this assessment but the first page of that assessment states that it is understood that either country may establish more restrictive regulations than adopted by the IPHC and that the Regional Fishery Management Council having authority over the geographic area may develop regulations.

This fishery is in a management induced decline. IPHC scientists admit that with current harvest rates "the probability that the stock falls below the historical minimum is very high".

The data of the latest IPHC "Report of Assessment and Research Activities", the IPHC memo of 12 June 1995, and the 1995 Stock assessment delineate this situation.

In the North Pacific we are not used to thinking of management in these terms. If we look at the crash of Northeastern cod we see the seeds of our own crisis. [#1] The New England council decided it would have a simple system to allow the fishery " to operate in response to its own internal forces." Similarly "Our harvest strategy is to remove a fixed fraction of the stock, which allows the stock to increase and decrease following natural trends in recruitment and growth"

In "the Case of the Northern Cod" [#2] we retrospectively see "...that scientists knew the truth but were not heard or allowed to speak...." We must hear the IPHC population scientist's answers to the "Seven Questions Concerning Halibut Resource Management" that were the subject of IPHC Memo of June 12, 1995.

Before we look at those questions and answers it is necessary to review IPHC's best scientific data. [#3] The 1994 RARA figure 2 shows the rapid decline of this stock. CPUE has remained high probably due to advances in technology such as circle hooks, and wide spread use of improved electronics and gear (high CPUE was also seen during the collapse of Northern Cod). Several scenarios attempted to explain recruitment success. [#4] Looking at a plot of recruitment versus spawning biomass it is obvious that neither a domed function or flat function explain the data. IPHC postulates a cyclic scenario where recruitment is more directly tied to ecological conditions than spawning biomass. The best population data is available from the fishery, which targets on the spawning biomass, so the depressed stock benchmark is the 'historic minimum spawning biomass'. Whatever this term means - e.g. overfished, commercially threatened, depressed, or weak, - we should all be able to agree that taking the stock below the lowest spawning biomass ever known would not be appropriate management for a fishery under your supervision. As you can see, in 1993 it was estimated that continued fishing at a 35% exploitation rate had a 96 % probability of doing exactly that, and reduction to 30 % exploitation rate still had a 41 % probability of taking the spawning biomass below the historical minimum.

If next we look at the Historical Exploitation Rates table, [#5] you can see the increasing rate in recent years. It is said that these rates decrease as further year cohort analysis firms them. That is only the case if the biomass was being underestimated by stronger recruitment than modeled as happened in the 1980's. Plotting exploitation rate on the biomass/recruitment graph [#6] shows an alarming relationship. Your Stock Assessment, page 5, states: "This year's recruitment again represents the lowest recruitment of 8-year-olds observed in nearly two decades."

The June 12, 1995 Memo answers the seven resource management questions that were submitted through a commissioner to the IPHC.

The first answer verifies the exploitation rate chart vs. biomass. Additionally, it states that "The target harvest rate was deliberately increased in 1987, when the conservative management policy adopted to rebuild the stocks was abandoned in favor of a constant exploitation yield (CEY) strategy, once the stocks had reached record high levels." -- What are we doing? If recruitment is at the lowest levels in decades and the exploitable biomass decreased 32% in only two years (Stock Assessment p 5), why are we using a non-conservative CEY strategy designed for record population levels? --

Answers 2 and 3 show that we now have refined biomass estimates so as not to underestimate as in the past. A 30 % harvest rate of the full biomass means that we will take a much larger proportion of the stock than when we were underestimating the biomass.

The answer to question 5 should shock us all. Under the current 30 % harvest rate "the probability that the stock falls below the historical minimum is very high...." Let's read that again to be sure, Under the current 30 % harvest rate "the probability that the [spawning biomass] stock falls below the historical minimum is very high...."

Question number 6 asked if 30 % harvest rate and 20 % natural mortality meant that one half of all the sexually mature halibut will be killed in 1995. The answer that really between 40 and 45 % of all fish between the ages of 8 and 20 will die in 1995 under current CEY strategy is not comforting. I don't think there is a farmer in the world that would even think about taking such a large percentage out of a long lived, late maturing animal, without knowing that he was destroying his future - especially in a time of slower than normal growth rate.

Memo answer 7 shows we know as much as that hypothetical farmer. "No, we do not expect the 1994 recruitment to make up for the 1995 removals. We actually do not expect that recruitment will compensate for total annual mortality...." The IPHC's estimated 25 million pounds coming into the exploitable biomass won't make up for the 50 million pounds we harvest ! ! !

Fishermen have been told and have bought a bedtime story that halibut has been undergoing a 5 to 15 % natural, annual decline for the past several years. This year with an exploitable biomass of 243 million pounds that 10 % average loss equals around 24.3 million pounds. Does anyone think it is just coincidence that this equals the 25 million pound overharvest.

We must ask ourselves what is meant by sustainable yield, the precautionary principle, and does a Constant Exploitation have any relation to ABC or does it rather ignore it.

You are charged with co-management of this valuable resource based on the best available science. I think it is obvious from the data that it is imperative to drastically reduce the level of mortality on the spawning population and drastically reduce the mortality on pre-recruits. Let us not blithely follow the route of New England to a 'Twilight of the Halibut'.

Twilight of the Cod

the New England council

Its goal, it said, was a simpler system that would allow the fishery "to operate in response to its own internal forces." As the decade progressed, the fishery did just that—

APRIL 1995 57 DISCOVER

Our harvest strategy is to remove a fixed fraction of the stock, which allows the stock to increase and decrease following natural trends in recruitment and growth. This means that during some years removals exceed the annual surplus production so the stock declines....

IPHC Memo 12 June 1995

Another important question is why those scientists who knew or suspected the problems of stock assessment did not speak up or were not heard. There are several directions to take in addressing this question about the sociology and political economy of science. One is that scientists knew the truth but were not heard or not allowed to speak because those charged with making fisheries policy had reasons to favor more generous assessments.[21] Another concerns the defensive behavior of bureaucracies under siege.[22] A third concerns relationships between scientists and policy-makers. The organization of the fisheries agency may have contributed to the problem, paradoxically, by isolating scientists from policy (cf. Susskind 1994, who makes a similar argument with respect to international environmental policy).[23] One result was that most scientists lost touch with the fishing industry, which may have further marginalized and delegitimized information from the inshore fishery. Moreover, when scientists had to present their assessments to officials in other branches and to the scientific advisory body (CAFSAC), they felt pressured to give the simpler answers or at least to be consistent, omitting questions they had about reliability, degrees of uncertainty, or the very models and data-sets they were using (see interview in Finlayson 1994: 79).

Table 2. **Trade-offs between long-term average yield and the risk that the spawning stock drops below the historical minimum at least once over 25 years of simulation, under the three different stock-recruitment models considered.**

Recruitment scenario	Harvest rate	Relative long-term yield (%)	Probability that spawning stock drops below historical minimum
Dome-shaped	0.35	100	0.47
	0.30	96	0.04
Cyclic	0.35	100	0.96
	0.30	97	0.41
Flat	0.35	100	0.30
	0.30	99	0.01

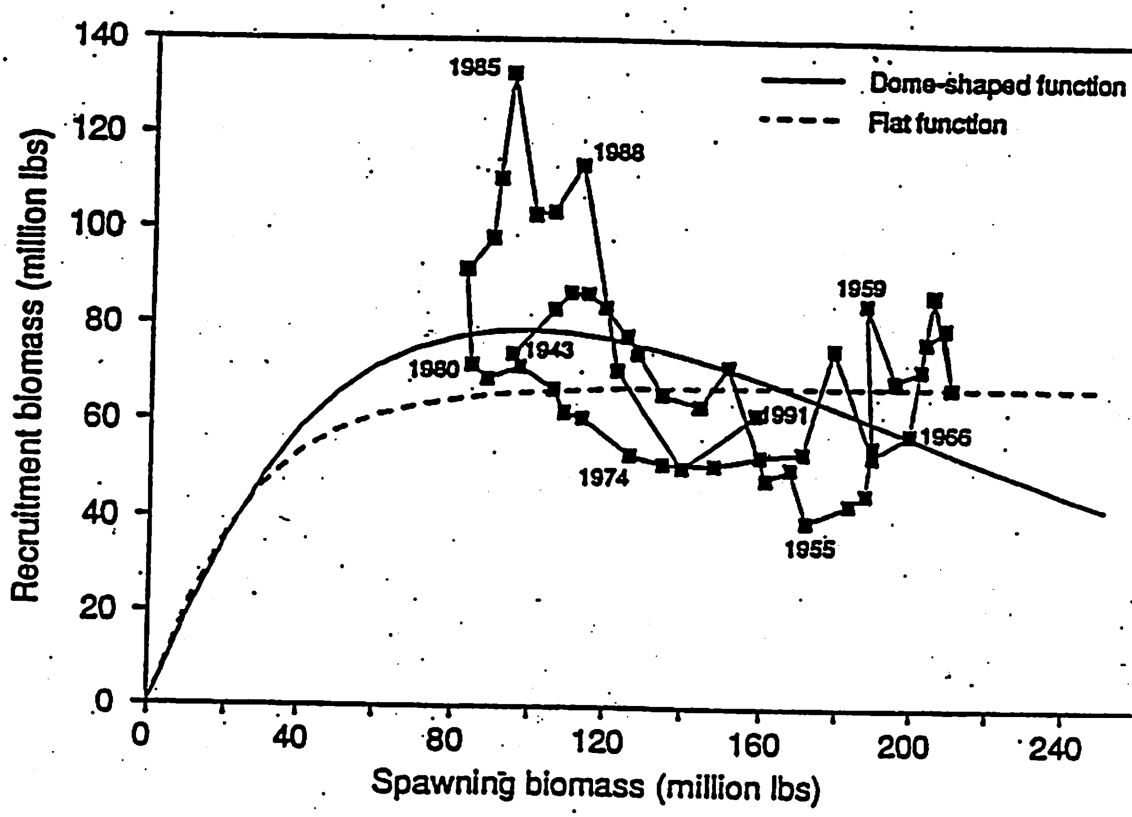

Table A.5 Historical Exploitation Rates (Closed Subarea)

Year	AREA 2A	2B	2C	3A	3B	4	Total	+Bycatch
1974	0.29	0.14	0.17	0.14	0.17	0.03	0.13	0.25
1975	0.25	0.21	0.19	0.17	0.25	0.03	0.17	0.24
1976	0.15	0.23	0.17	0.17	0.26	0.03	0.17	0.25
1977	0.13	0.18	0.10	0.13	0.28	0.05	0.13	0.20
1978	0.07	0.15	0.12	0.14	0.11	0.06	0.12	0.19
1979	0.04	0.15	0.12	0.14	0.03	0.06	0.12	0.19
1980	0.02	0.17	0.08	0.13	0.01	0.03	0.10	0.19
1981	0.13	0.17	0.08	0.14	0.02	0.04	0.11	0.17
1982	0.17	0.16	0.07	0.13	0.15	0.05	0.11	0.15
1983	0.19	0.14	0.10	0.12	0.21	0.13	0.13	0.16
1984	0.33	0.20	0.09	0.14	0.16	0.09	0.14	0.17
1985	0.38	0.22	0.13	0.14	0.25	0.12	0.16	0.18
1986	0.52	0.22	0.15	0.20	0.21	0.16	0.19	0.21
1987	0.60	0.23	0.15	0.18	0.18	0.19	0.18	0.21
1988	0.35	0.22	0.16	0.20	0.16	0.13	0.19	0.22
1989	0.32	0.18	0.14	0.18	0.17	0.13	0.17	0.20
1990	0.18	0.15	0.15	0.16	0.19	0.15	0.16	0.20
1991	0.15	0.13	0.15	0.14	0.30	0.17	0.16	0.19
1992	0.20	0.13	0.17	0.16	0.27	0.19	0.17	0.21
1993	0.24	0.19	0.21	0.18	0.31	0.20	0.20	0.24
1994	0.22	0.20	0.22	0.25	0.22	0.18	0.23	0.28

REPORT OF ASSESSMENT AND RESEARCH ACTIVITIES 1994

Coast Wide Stock Biomass, Recruitment, and CPUE

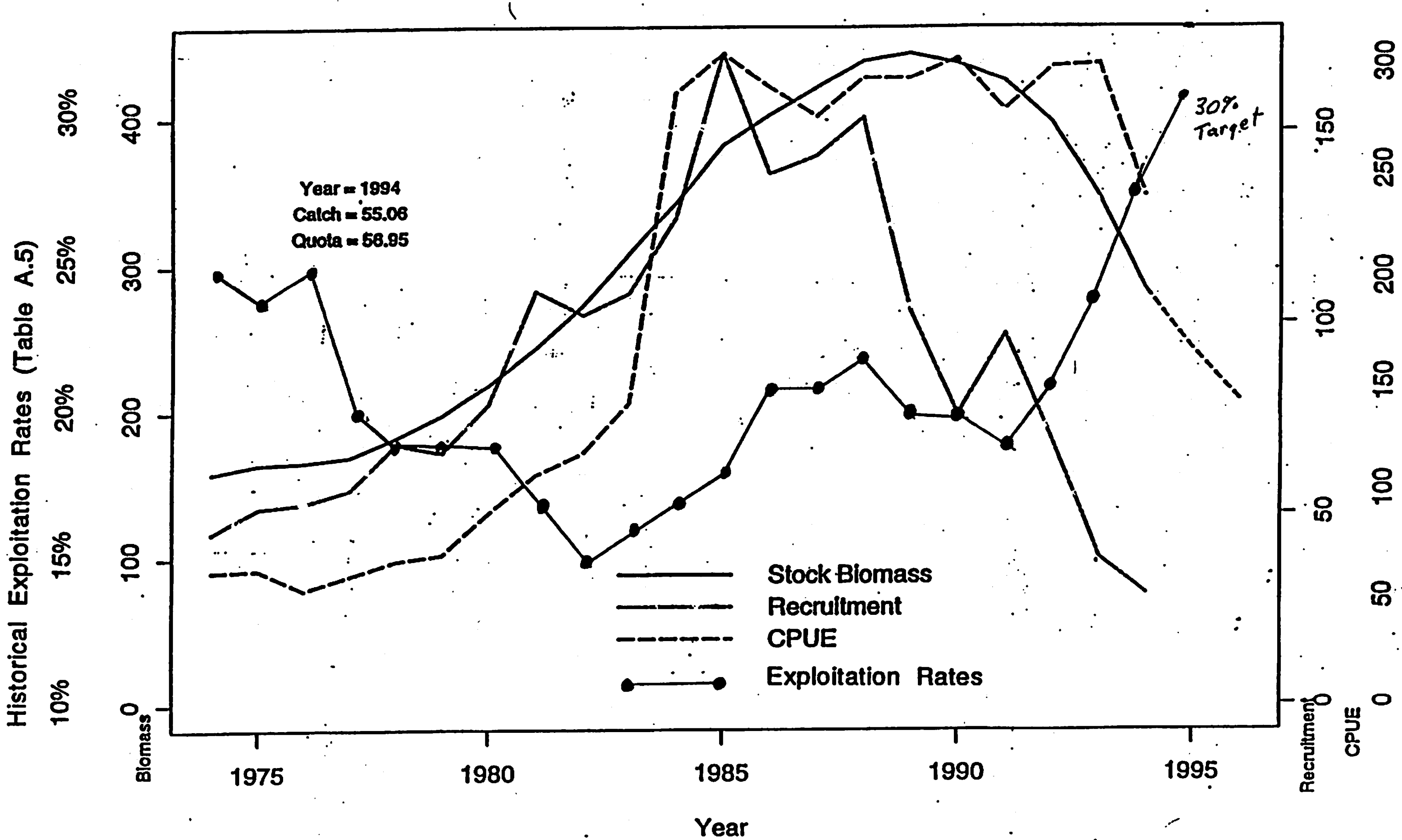

Figure 2. Biomass (Mil. Pounds), Recruitment (Mil. Pounds), CPUE (Pounds/Skate)

QUESTIONS ABOUT HALIBUT RESOURCE MANAGEMENT

Considering the 1994 RA/RA Historical Exploitation Rates page 81 table and our setting of 30% in 1995, are we taking an increasing percentage of the biomass?

Have we refined our sampling techniques to reduce variability and give a more accurate estimate of the true biomass than before 1993?

Does this leave us taking a smaller slice out of a larger estimated pie, which actually results in larger percentage exploitation than in the 1970's, 80's and early 90's.

Alma's 1993 work showed a 41% probability of taking the "spawning biomass below the historic minimum" under the cyclic recruitment model using the 30% exploitation rate. What are the probabilities with the 20% and other rates mentioned in that study but not shown?

IPHC is now operating on a 30% exploitation rate. What is the current estimate of the probability that we will take the spawning biomass below the "historic minimum" with that rate? If there isn't a number, what is the 'best guess' of the population scientists?

Very roughly, does a 30% exploitation and a 20% natural mortality mean that about 50% of all the sexually mature halibut, ages 8 - 20, will die in 1995? Is the recruitment of 8 year old fish sufficient to offset this biomass and reproductive loss?

Does 1994 RA/RA figure 2 show that we expect to have about 25 million pounds of recruitment to make up for our harvest of about 50 million pounds and natural mortality of about 20 million pounds? ((est. 20% of one half [?% sexually mature] of the approx. 200 Mil. pound total biomass)) file: Z/ana/memo

IPHC Memo

12 June 1995

To: Don
From: Ana
Subject: Questions about halibut resource management

(1) Considering historical exploitation rates (1994 RARA, pg. 81) and our setting of 30% in 1995, are we taking an increasing percentage of the biomass?

Table A.5 of RARA 1994 shows the historical exploitation rates calculated by dividing historical catches by the corresponding exploitable biomasses, *as estimated in* 1994 (see Fig. 2 of Blue Book for a graphical representation). Exploitation rate was at a minimum around 1980 and increased thereafter. The target harvest rate was deliberately increased in 1987, when the conservative management policy adopted to rebuild the stocks was abandoned in favor of a constant exploitation yield (CEY) strategy, once the stocks had reached record high levels. This explains part of the increasing trend. In addition, historical harvest rates appear now to be lower than the target because the estimates of past stock biomasses have been adjusted upwards based on current data, compared to the initial estimates used to set quota recommendations. The recommended quota for 1994 was set based on the 1993 assessment; as this assessment is still close to our most current assessment, the 1994 harvest rates are closer to our current target of 30%, and they are thus higher than the harvest rates realized in past years. The estimates of the realized harvest rates in the 1990's will change in turn when estimates of current stock sizes are revised in future years.

(2) Have we refined our sampling techniques ...?

Our stock assessment techniques (and management strategies) are under constant re-evaluation based on their performance. But aside from any deliberate change in techniques, every year we add to our data series one more year of fishery data, and we revise all previous estimates of stock biomass based on the current data. It is the nature of the stock-assessment technique that the estimates of all years are linked by a population dynamics model that tracks cohorts through time. So when one biomass estimate changes, all past estimates change in a consistent manner, the most recent estimates being the most unstable ones. It is the addition of new data, and not so much the changes in our procedures, that has caused us to adjust past stock estimates upwards.

(3) Does this leaves us taking smaller slices out of a larger estimated pie?

Yes, having underestimated past stock sizes leaves us taking smaller slices than we attempted based on the target harvest rate. This problem, however, has only affected the last six years or so. Exploitation rates in the early 80's were low because a conservative policy designed to rebuild the stocks was in place, and only 75% of the annual surplus production was taken. Harvest rates in the early 70's (prior to 1974) were actually higher than our current targets (if bycatch is accounted for).

(4) Regarding probabilities that the spawning biomass falls below the historic minimum, reported in the blue-book of January 1993.

An expanded version of the study communicated in the IPHC Annual Meeting of 1993 was reported in the RARA of 1992. Other parameters related to the probability that the stock drops below its historic minimum were reported there for harvest rates ranging from 0.20 to 0.55. Notice that these probabilities change dramatically from year to year as the strength of new recruited year classes is estimated and revised estimates of stock biomass are produced. The study reported in 1992 RARA was based on data up to 1991, so those probabilities no longer apply.

(5) What is the current probability that we will take the spawning biomass below the historic minimum under 30% harvest rate?

Based on 1994 assessment, which shows extremely low recruitments over the last years, coupled with the dramatic drop in weight at age, the probability that the stock falls below the historical minimum is very high, as the average trajectories of exploitable biomass shown in the blue-book of 1995 suggest. We believe, however, that recent declining trends in recruitment may be less dramatic than indicated by the 1994 assessment. Past stock assessments have been adversely affected by a reduction of the halibut size-at-age, which has likely changed the vulnerability of the different age classes (young age classes are less vulnerable now because they are smaller). We are currently implementing some substantial changes into our stock assessment model, mostly aimed at incorporating the effects of the changes in growth on selectivity of the different age clases. We will re-evaluate our target harvest rate (and size limit) using the new model. The probability that the spawning biomass drops below the historical minimum as part of that work for a range of harvest rates will be estimated .

(6) Does 30% exploitation and 20% natural mortality mean that ~ 50% of all sexually mature halibut will die in 1995?

No, under 30% exploitation (F=0.4) and natural mortality =0.2, the fraction of mature fish that dies is closer to 40%; it would be 45% if all fish 8-20 were 100% vulnerable and mature. The proportion should in reality be less than that because the quota (harvest rate) is reduced to compensate for spawning biomass losses due to bycatch.

(7) Does 1994 RARA (Fig 2, pg. 66) show that we expect a 25 million lbs recruitment to make up for our harvest of about 50 million lbs?

No, we do not expect the 1994 recruitment to make up for the 1995 removals. We actually do not expect that recruitment will compensate total annual mortality on a year by year basis. Rather, we choose a target harvest rate based on historical productivity of the stock, considering the mean productivity and its variability. We use simulation models that are consistent with past experience to indicate the range of harvest rates that the stock can sustain, and the expected yield and risks associated with each of them. Our harvest strategy is to remove a fixed fraction of the stock, which allows the stock to increase and decrease following natural trends in recruitment and growth. This means that during some years removals exceed the annual surplus production and so the stock declines, while in others some of the surplus production is left for the stock to increase

Table 8. Results of 1995 stock assessment, based on projected 1995 exploitable biomass. Estimates are in millions of pounds, net weight.

	Area 2A	Area 2B	Area 2C	Area 3A	Area 3B	Area 4	Total
Catch/Quota							
1994 Quota	0.55[1]	10.00	11.00	26.00	4.00	5.40	56.95
1994 Catch	0.58[1]	9.90	10.25	25.05	3.95	5.33	55.06
Exploitable Biomass	2.25	46.07	46.45	103.88	16.52	26.92	242.09
Total CEY	0.68[1]	13.82	13.94	31.16	4.96	8.08	72.63
Other Catches							
Sport	----[1]	0.66	1.80	5.28	0.00	0.09	7.83
Waste	0.01	0.30	0.41	1.82	0.14	0.17	2.85
Bycatch	0.15	3.04	3.07	6.87	1.09	1.78	16.00
Personal Use	0.00	0.30	0.11	0.33	0.06	0.12	0.92
TOTAL	0.16	4.30	5.39	14.30	1.29	2.16	27.60
Setline CEY	0.52[1]	9.52	8.54	16.87	3.66	5.92	45.03

[1]Sport estimates included for Area 2A.

prepared from NMFS/RAM data of 29-Nov-95 for
Combined IFQ-CDQ landings plus 2A and 2B from IPHC 12/4/95

Area	2A	2B	2C	3A	3B	4	Total
	0.52	9.496	7.803	18.014	3.197	4.704	43.734

1995 30% setline CEY of projected exploitable biomas minus
1995 setline CEY reported landings

45.03 - 43.734 = 1.296 million pounds

Percentage not harvested from 1995 projected exploitable biomass

$$\frac{1.296}{45.03} = 2.88\ \%$$

DRAFT ENVIRONMENTAL ASSESSMENT
FOR
1996 GROUNDFISH TOTAL ALLOWABLE CATCH SPECIFICATIONS
IMPLEMENTED UNDER THE AUTHORITY OF THE
FISHERY MANAGEMENT PLANS FOR THE
GROUNDFISH FISHERY OF THE BERING SEA AND ALEUTIAN ISLANDS AREA
AND
GROUNDFISH OF THE GULF OF ALASKA

Prepared by the

Alaska Fisheries Science Center
National Marine Fisheries Service
Seattle, Washington
and the
Alaska Region
National Marine Fisheries Service
Juneau, Alaska

October 1995

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DRAFT ENVIRONMENTAL ASSESSMENT
FOR
1996 GROUNDFISH TOTAL ALLOWABLE CATCH SPECIFICATIONS

IMPLEMENTED UNDER THE AUTHORITY OF THE
FISHERY MANAGEMENT PLANS FOR THE GROUNDFISH FISHERY
OF THE BERING SEA AND ALEUTIAN ISLANDS AREA
AND
GROUNDFISH OF THE GULF OF ALASKA

SUMMARY

This draft environmental assessment (EA) summarizes existing analyses of potential impacts of specifying 1996 total allowable catch (TAC) amounts for groundfish in the Bering Sea and Aleutian Islands Management Area (BSAI) and in the Gulf of Alaska (GOA). The 1996 TAC specifications were recommended by the North Pacific Fishery Management Council (Council) at its September 27 to October 2, 1995, meeting after a review of current information about groundfish stocks. Updated information on the status of groundfish stocks will be reviewed by Plan Teams at their November 13-17, 1995 meeting, and be presented in the final Stock Assessment and Fishery Evaluation Report (SAFE) for the 1996 Gulf of Alaska Groundfish Fishery (NPFMC, November, 1995) and the Stock Assessment and Fishery Evaluations Report for the Groundfish Resources of the Bering Sea/Aleutian Islands Regions as Projected for 1996 (NPFMC, November, 1995). The Plan Teams November, 1995 acceptable biological catches (ABCs) and proposed TACs for 1996 fisheries recommended by the Council at its September 1995 meeting are the best available information, and represent the levels of TAC the Council is likely to recommend for 1996 during its December 4-8, 1995 meeting. This environmental assessment evaluates effects of specifying the proposed 1996 TACs: (1) equivalent to the TACs presented in the final specification notice for the 1995 fisheries as published in the Federal Register (60 FR 8470, 60 FR 8479; February 4, 1995); and (2) as proposed in the initial TAC specifications recommended at the Council's September, 1995 meeting.

The sums of the recommended proposed 1996 ABCs, and overfishing levels (OFL) from the SAFEs and the TACs as recommended by the Council follow. The Fishery Management Plan for the Groundfish Fishery of the Bering Sea and Aleutian Islands (BSAI FMP) and the Fishery Management Plan for the Groundfish of the Gulf of Alaska

(GOA FMP) have established Optimum Yields (OY) for each respective fishery. The OY established under the BSAI FMP is limited to 2 million mts and the OY established under the GOA FMP is limited to 800,000 mt. Amounts of TAC, ABC and overfishing (OFL), for 1996 are:

1996	BSAI	GOA
ABC[1]	2,929,885	478,796
TAC	2,000,000	267,917
OFL	3,564,835	750,165

The EA addresses impacts on target groundfish species categories, marine mammals, sea salmon, other predators and prey, which constitute part of the ecosystem. Socioeconomic impacts are also addressed.

1.0 Purpose and Need

The groundfish fisheries in the Exclusive Economic Zone (EEZ) (3 to 200 nautical miles (nm) offshore) off Alaska are managed under the Fishery Management Plan (FMP) for Groundfish of the GOA and the FMP for the Groundfish Fisheries of the BSAI. Both FMPs were prepared by the Council under the Magnuson Fishery Conservation and Management Act (Magnuson Act). The GOA FMP was approved by the Secretary of Commerce (Secretary) and became effective in 1978 and the BSAI FMP became effective in 1982.

Actions taken to amend FMPs or implement other regulations governing the groundfish fisheries must meet the requirements of Federal laws and regulations. In addition to the Magnuson Act, the most important of these are the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), Executive Order (E.O.) 12866, and the Regulatory Flexibility Act (RFA).

NEPA requires a description of the purpose and need for the proposed action as well as a description of alternative actions that may address the problem. This information is included in Section 1 of this document. Section 2 contains information on the biological and environmental impacts of the alternatives as required by NEPA. Impacts on endangered species and marine mammals are also addressed in this section.

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1 As recommended by the Council, September, 1995.

The groundfish catch off Alaska has become an important segment of the total U.S. fishing industry (Kinoshita, et al.,1995). It is a major factor in terms of generating income, exports, and employment opportunities. As a consequence of this industry, the environment impacts associated with the annual harvest of groundfish must be addressed under the NEPA.

This EA is prepared to analyze possible environmental impacts of harvesting 1996 proposed TACs relative to 1995 final TACs. To avoid undue length, this EA references existing documents that are prepared annually to assess the environmental impacts of harvest the annual TACs. These references are: (1) Final Stock Assessment and Fishery Evaluation (SAFE) Report for the 1995 GOA Fishery (NPFMC, November 1994, GOA SAFE); (2) Stock Assessment and Fishery Evaluation Report for the Groundfish Resources of the BSAI Regions as Projected for 1995 (NPFMC, November 1994, BSAI SAFE); (3) 1995 Ecosystems Considerations Paper; (4) Economic Status of the Groundfish Fisheries off Alaska; and the (5) the Final EA prepared for the 1995 Groundfish Total Allowable Catch Specifications for the groundfish fisheries off Alaska. In addition, the following documents provide support for the status quo alternative: Final Environmental Assessment for 1995 Groundfish Total Allowable Catch Specifications Implemented Under the Authority of the Fishery Management Plans for the Groundfish Fishery of the Bering Sea and Aleutian Islands Area and Groundfish of the Gulf of Alaska.

At a meeting September 27 to October 2, 1995, the Council recommended initial TACs based on current stock information presented by the Plan Teams and its Scientific and Statistical Committee (SSC) and Advisory Panel (AP) (Tables 1, 2 and 3) . Information on which the Council's recommendations were based will be updated at the November, 1995 Plan Team meeting to be reviewed at the December, 1995 Council meeting. Once implemented by the Secretary, these TACs will support harvests (fishery removals) during the 1996 fishing year.

In preparing the September 1995 SAFE reports for the 1996 GOA and BSAI fisheries, the Plan Teams reviewed the best available scientific information about groundfish stocks in the BSAI and GOA. The process of setting ABCs and TACs includes an analysis of a level of fishing that constitutes overfishing. Overfishing levels for each TAC species are derived as described in the individuals chapters of the SAFE document. At its September and December meetings, the Council, its Advisory Panel, and its Scientific and Statistical Committee (SSC), annually review biological information about the condition of groundfish stocks in the BSAI. This information is compiled by the Council's BSAI Groundfish Plan Team (Plan Team) and is presented in the SAFE Report. The Plan Team annually produces such a report as the first step in the process of specifying TACs. The SAFE Report contains a review of the latest scientific analyses and estimates of each species' biomass, maximum sustainable yield (MSY), acceptable biological catch (ABC) and other biological parameters, as well as summaries of the ecosystem and the economic condition of groundfish fisheries off Alaska. A preliminary 1996 SAFE Report dated September 1995 provides an update on status of stocks. These preliminary assessments will be updated based on biological survey work done during the summer of 1995 at the November Plan Team meetings. Assessments will be made available by the Plan Team in November 1995, in the final edition of the 1996 SAFE Report. Final ABCs for the 1996 fishing year will be based on the most recent stock assessments. The proposed ABCs adopted by the Council for the 1996 fishing year are based on the best available scientific information, including projected biomass trends, information on assumed distribution of stock biomass, and revised technical methods used to calculate stock biomass. At its December, 1995 meeting the Council will review the final SAFE report and make recommendations based on this information.

Procedure for Estimating ABC

The Council bases its definition of ABC on the definition contained in 50 CFR part 602--Guidelines For Fishery Management Plans. These guidelines (§ 602.11(e)(1)) state,

> "ABC is a preliminary description of the acceptable harvest (or range of harvests) for a given stock or stock complex. Its derivation focuses on the status and dynamics of the stock, environmental conditions, other ecological factors, and prevailing technological characteristics of the fishery."

Under these guidelines, the Council is provided with the flexibility needed to define overfishing appropriate to the individual stock or species characteristics, as long as it is defined in a way that allows the Council and NMFS to evaluate the condition of the stock relative to the definition. Application of the overfishing definition requires some flexibility, because the amount of data for different stocks varies. The calculations used to derive preliminary overfishing levels for a given stock or stock complex are described in the preliminary 1996 SAFE Report dated September 1995 and will be updated in the final 1996 SAFE report when it is finalized in November.

Environmental Impacts of the Alternatives

The environmental impacts generally associated with fishery management actions are effects resulting from: (1) harvest of fish stocks which may result in changes in food availability to predators, changes in the population structure of target fish stocks, and changes in community structure; (2) changes in the physical and biological structure of the benthic environment as a result of fishing practices (e.g., effects of gear use and fish processing discards); and (3) entanglement/entrapment of non-target organisms in active or inactive fishing gear. The effects of the proposed 1996 groundfish total allowable catch amounts on the biological environment and associated impacts on marine mammals, seabirds, and other threatened or endangered species are summarized throughout this document. Additional information will be added to this process when it become available after the Final SAFE Report becomes available in November, 1995.

This analysis summarized impacts of the annual groundfish commercial fishery removals on the physical, biological, and socioeconomic environment. Fishery removals toward the achievement of TACs are expected to have some impact on the environment. These impacts could be more or less than those resulting from the fishery removal during previous years. Physical impacts are those that might result from physical changes as a direct result of fishing practices and nutrient changes due to processing and dumping of fish wastes. Biological impacts are those that might affect fish stocks, marine mammals, seabirds, and other predators and prey. Socioeconomic impacts on the fishing industry are those affecting gross revenues in the groundfish industry as well as in industries dependent on other fisheries.

Trends shown in the total biomass of individual species comprised in the ecosystem of the BSAI and GOA support the assessment that most fished populations of fish and crab have been exhibiting periods of increase and decrease that are unrelated to changes in fishing pressure (Ackley, et al, 1995).

2.0 DESCRIPTION OF ALTERNATIVES

Alternative 1 - Status Quo: Implement 1996 TACs that are unchanged from 1995 final specifications of TAC.

Under this alternative, the sum of the BSAI and GOA TACs during 1996 would be the same as those specified for the 1995 groundfish fisheries in the BSAI and GOA (2,000,000 and 279,463 mt, respectively).

Alternative 2: Implement 1996 TACs equivalent to proposed TACs recommended by the Council at its September, 1995 meeting.

Under this alternative, the sum of the BSAI and GOA TACs would be 2,000,000 mt and 267,917 mt, respectively.

3.0 NEPA REQUIREMENTS: ENVIRONMENTAL IMPACTS OF THE ALTERNATIVES

An EA is required by NEPA to determine whether the action considered will result in significant impact on the human environment. The environmental analysis in the EA provides the basis for this determination and must analyze the intensity or severity of the impact of an action and the significance of an action with respect to society as a whole, the affected region and interests, and the locality. If the action is determined not to be significant based on an analysis of relevant considerations, the EA and resulting finding of no significant impact (FONSI) would be the final environmental documents required by NEPA. An environmental impact statement (EIS) must be prepared for major Federal actions significantly affecting the human environment.

An EA must include a brief discussion of the need for the proposal, the alternatives considered, the environmental impacts of the proposed action and the alternatives, and a list of document preparers. The purpose and need and a description of the alternatives are discussed in Sections 1 and 2, and the list of preparers is in Section 6. This section contains the discussion of the environmental impacts of the alternatives including impacts on threatened and endangered species and marine mammals.

3.1 Overview of status

The status of each target species category, biomass estimates, and ABCs is presented both in summary and in detail in the GOA SAFE and BSAI SAFE reports dated September 1995. This EA addresses significant changes for proposed 1996 TACs and the Final 1995 TACs and provides relevant socioeconomic information regarding the proposed 1996 ABCs.

3.1.1 Status of BSAI and GOA target groundfish categories

In the GOA and BSAI, groundfish are managed under the FMP under four species categories. These four categories are: (1) Prohibited species--those species and species groups the catch of which must be returned to the sea with a minimum injury; (2) Target species--those species which are commercially important; (3) Other species--those species and species groups which currently are of slight economic value and are not generally targeted upon; and (4) Nonspecified species--those species and species groups generally of no current economic value taken by the groundfish fishery in Federal waters only as incidental catch.

TACs, and ABCs are proposed in the alternatives are set forth on Tables 1 and 2 for the groundfish fishery the BSAI and Table 3 for the GOA.

Table 1. Bering Sea and Aleutian Islands Groundfish Proposed Initial 1996 ABCs and TACs (mt). Alternative 2-Implement Proposed 1996 specifications.

Species	Area	Biomass	OFL	ABC	TAC	ITAC
Pollock	EBS	8,080,000	1,500,000	1,250,000	1,250,000	1,062,500
		"A" season			45%	478,125
		"B" season			55%	584,375
	AI	189,000	60,400	56,600	56,600	48,110
	Bogoslof	1,020,000	102,000	102,000	1,000	850
Pacific cod	BS/AI	1,620,000	390,000	328,000	250,000	212,500
Yellowfin sole	BS/AI	2,770,000	319,000	277,000	190,000	161,500
Greenland turbot	BS/AI	150,000	27,200	7,000	7,000	5,950
	BS				1,600	3,987
	AI				2,200	1,963
Arrowtooth	BS/AI	625,000	138,000	113,000	10,227	8,693
Rock sole	BS/AI	2,330,000	388,000	347,000	60,000	51,000
Flathead sole	BS/AI	725,000	167,000	138,000	30,000	25,500
Other flatfish	BS/AI	677,000	137,000	117,000	19,540	16,609
Sablefish	EBS	16,500		1,600	1,600	1,320
	AI	13,900		2,200	2,200	1,788
	BS/AI		4,900			
POP complex						
True POP	EBS	47,100	2,910	1,850	1,850	1,573
Other POP	EBS	29,700	1,400	1,400	1,260	1,071
True POP	AI	252,000	15,900	10,500	10,500	8,925
Sharp/Northern	AI	94,500	5,670	5,670	5,103	4,338
Short/Rougheye	AI	45,000	1,220	1,220	1,098	933
Other rockfish	EBS	7,300	365	365	329	280
	AI	15,500	770	770	693	589
Atka mackerel	AI	578,000	164,000	138,000	80,000	68,000
	Western			71,600	41,520	35,292
	Central			19,300	11,200	9,520
	Eastern			47,100	27,280	23,188
Squid	BS/AI	n/a	3,110	3,110	1,000	850
Other species	BS/AI	682,000	136,000	27,600	20,000	17,000
BS/AI TOTAL		19,967,500	3,564,845	2,929,885	2,000,000	1,699,878

EBS = eastern Bering Sea

BS/AI = Bering Sea & Aleutian Islands

BS = Bering Sea

AI = Aleutian Islands

OFL = overfishing level

ABC = acceptable biological catch

TAC = total allowable catch

ITAC = recommended TAC less the 15% reserve.

TABLE 2. Final 1995 Acceptable Biological Catch (ABC), Total Allowable Catch (TAC), TAC (ITAC), And ITAC Apportionments Of Groundfish In The Bering Sea An Aleutian Islands Area.[1][2]

Species	ABC	TAC	Initial TAC (ITAC) DAP (3)(4)	Over Fishing Level
Pollock				
Bering Sea (BS)	1,250,000	1,250,000	1,062,500	1,500,000
Aleutian Islands (AL)	56,600	56,600	48,110	60,400
Bogoslof District	22,100	1,000	850	22,100
Pacific cod	328,000	250,000	212,500	390,000
Sablefish				
BS	1,600	1,600	1,360	
AL	2,200	2,200	1,870	4,900
Atka mackerel TOTAL	125,000	80,000	68,000	335,000
	W 55,600	16,500	14,025	....
	C 55,900	50,000	42,500	....
	E 13,500	13,500	11,475	....
Yellowfin sole	277,000	190,000	161,500	319,000
Rock sole	347,000	60,000	51,000	388,000
Greenland turbot	7,000	7,000	5,950	27,200
BS	4,669	4,669	3,969	....
AI	2,331	2,331	1,981	....
Arrowtooth flounder	113,000	10,227	8,693	138,000
Flathead Sole	138,000	30,000	25,500	167,000
Other flatfish (5)	117,000	19,540	16,609	137,000
Pacific Ocean perch				
BS	1,850	1,850	1,573	2,910
AL	10,500	10,500	8,925	15,900
Other red rockfish (6)				
BS	1,400	1,260	1,070	1,400
Sharpchin/Northern				
AL	5,670	5,103	4,338	5,670
Shortraker/Rougheye				
AL	1,220	1,098	933	1,220
Other rockfish (7)				
BS	365	329	280	365
AL	770	693	589	770
Squid	3,110	1,000	850	3,110
Other Species (8)	27,600	20,000	17,000	136,000
TOTALS	2,836,985	2,000,000	1,700,000	3,655,945

TABLE 3. GULF OF ALASKA Groundfish Proposed 1996 ABCs & TACs and 1995 Final ABCs & TACs

Species	Area	1995 ABC	Final Specifications TAC	Catch*	Proposed 1996 ABC	Proposed 1996 TAC
Pollock	W (61)	30,380	30,380	22,239	24,500	24,50
	C (62)	15,310	15,310	11,928	12,500	12,50
	C (63)	16,310	16,310	12,265	13,000	13,000
	E	3,360	3,360	3,353	2,700	2,700
	Total	65,360	65,360	49,785	52,700	52,700
Pacific Cod	W	20,100	20,100	22,204	18,850	18,850
	C	45,650	45,650	40,683	42,900	42,900
	E	3,450	3,450	1,121	3,250	3,250
	Total	69,200	69,200	64,008	65,000	65,000
Flatfish, Deep Water	W	670	460	48	670	460
	C	8,150	7,500	1,713	8,150	7,500
	E	5,770	3,120	190	5,770	3,120
	Total	14,590	11,080	1,951	14,590	11,080
Rex Sole	W	1,350	800	217	1,35	800
	C	7,050	7,050	3,311	7,050	7,050
	E	2,810	1,840	121	2,81	1,840
	Total	11,210	9,690	3,649	11,210	9,690
Flathead Sole	W	26,280	2000	569	26,280	2000
	C	23,140	5000	1,267	23,140	5000
	E	2,850	2740	13	2,850	2740
	Total	52,270	9,740	1,849	52,270	9,740
Flatfish, Shallow Water	W	8,880	4,500	336	8,880	4,500
	C	17,170	12,950	3,377	17,170	12,950
	E	2,740	1,180	3	2,740	1,18
	Total	28,790	18,630	3,716	28,790	18,630
Arrowtooth	W	28,400	5,000	1,344	28,400	5,000
	C	141,290	25,000	12,526	141,290	25,000
	E	28,440	5,000	670	28,440	5,000
	Total	198,130	35,000	14,540	198,130	35,000
Sablefish	W	2,600	2,600	1,309	2,600	2,600
	C	8,600	8,600	6,124	8,600	8,600
	W. Yakutat	4,100	4,100	3,148	4,100	4,100
	E. Yak./SEO	6,200	6,200		6,200	6,200
	Total	21,500	21,500	10,581	21,500	21,500
Pacific Ocean Perch	W	1,180	1,014	1,420	1,460	1,260
	C	3,130	2,702	2,433	3,860	3,333
	E	2,220	1,914	966	2,740	2,366
	Total	6,530	5,630	4,819	8,060	rebuilding6,959

TABLE 3. GULF OF ALASKA Groundfish Proposed 1996 ABCs & TACs and 1995 Final ABCs & TACs						
		1995	Final	Specifications	Proposed	Proposed
Species	Area	ABC	TAC	Catch*	1996 ABC	1996 TAC
Shortraker/Rougheye	W	170	170	196	170	170
	C	1,210	1,210	1,162	1,210	1,210
	E	530	530	508	530	530
	Total	1,910	1,910	1,866	1,910	1,910
Rockfish, Other Slope	W	180	57	28	180	180
	C	1,170	368	564	1,170	1,170
	E	5,760	1,810	368	5,760	5,760
	Total	7,110	2,235	960	7,110	7,110
Rockfish, Northern	W	640	640	111	640	640
	C	4,610	4,610	3,746	4,610	4,610
	E	20	20	32	20	20
	Total	5,270	5,270	3,889	5,270	5,270
Rockfish, Pelagic Shelf	W	910	910	65	910	910
	C	3,200	3,200	1,573	3,200	3,200
	E	1,080	1,080	355	1,080	1,080
	Total	5,190	5,190	1,993	5,190	5,190
Rockfish, Demersal Shelf	SEO	580	580	168	580	580
Thornyhead	Gulfwide	1,900	1,900	905	1,560	1,560
Atka Mackerel	W		2,310	320	2,310	2,310
	C		925	85	925	925
	E		5	0	5	5
	Total	3,240	3,240	405	3,240	3,240
Other Species	Gulfwide	NA	13,308	3,240	NA	NA
GULF OF ALASKA	TOTAL	492,780	279,463	168,324	477,110	267,917

3.1.2. Recent Developments in Marine Mammals

The BSAI and GOA support the richest assemblage of marine mammals in the world. This includes at least eight species of pinnipeds (seals, sealions, and walrus), one species of sea otter, and twenty or more species of cetaceans (whales, dolphins and porpoises. Trends indicate the biomassess support the assessment that most fished populations of fish and crab have been exhibiting periods of increase and decrease that are unrelated to changes in fishing pressure. Changes in upper-level predator such as marine mammals and birds do not appear to be negatively correlated with fish removals although the effect of localized prey depletion through fishing activities on these predators remains unknown.

Marine mammals and seabird populations have been declining since 1975 during a major shift in the fishing activities in the BSAI and GOA. It has been theorized that these declines may be attributed to the effects of commercial fishing activity off Alaska, however, the complexity of ecosystem interaction and the lack of data makes it difficult to sort out how natural and anthropogenic factors have affected the carrying capacity of the ecosystems for marine mammals of the BSAI and GOA. Since the passage of the Magnuson Act, the fisheries off Alaska have grown to account for a significant portion of all U.S. landings. Whether or not food availability is the reason for declining marine mammals and seabird populations, the change in prey species abundance and composition is a plausible explanation although a cause-effect relationship has yet to be determined.

Information on distribution, food habits and potential interactions of cetaceans and pinnipeds with groundfish fisheries in the Bering Sea, Aleutian Islands and Gulf of Alaska is summarized in Appendix 1 of the Final EA for 1995 Groundfish Total Allowable Catch Specifications Implemented under the Authority of the Fishery Management Plans for the Groundfish Fishery of the Bering Sea and Aleutian Islands Area and Groundfish of the Gulf of Alaska. Recent developments in our knowledge of the population status and management actions concerning four species with documented interactions with groundfish fisheries (Steller sea lions, northern fur seals, harbor seals and killer whales) are summarized below.

Steller sea lions, northern fur seals, and Pacific harbor seals have experienced significant population declines in Alaskan waters over the past 30 years (Merrick et al., 1987; Pitcher 1990; Swartzman and Hofman 1991). Causes of these declines are presently unknown. Factors currently under investigation by NMFS and Alaska Department of Fish and Game (ADF&G) include changes in the natural environment (e.g., predation, ecosystem changes, disease, changes in the availability of small piscine prey), as well as human activities (e.g., fisheries, incidental and intentional takes, as well as entanglement in discarded fishing gear). Recent developments are summarized in the Ecosystems Considerations chapter of the SAFE 1996 document (SAFE, 1996) published at the September, 1995 Plan Team meeting. A Final Ecosystem Chapter will be available in November after the annual Plan Teams meeting.

Steller Sea Lions

NMFS had the authority to implement regulations necessary to protect Steller sea lions under the ESA and MMPA. Similarly, under the Magnuson Act, NMFS has the authority to regulate fishing activities that may be affecting sealions, directly or indirectly. However, the adequacy or inadequacy of existing regulatory mechanisms and protective regulations is difficult to evaluate because to the lack of a clear cause and effect relationship between human activities and the decline in the western populations segment. Various regulations have been implemented, are listed below.

Although the Ecosystem Considerations (SAFE, 1995) document states that no new population survey efforts were conducted in Alaskan waters during 1995, under the Marine Mammal Assessment Program conducted by NMFS and USF&WS, previous Steller Sea Lions surveys indicate a decline of 24 percent in the population since 1989. On October 4, 1995 NMFS proposed to reclassify the Steller Sea Lion. This species is currently listed under the Endangered Species Act of 1973 (ESA) as threatened throughout its range, which extends from California and associated waters to Alaska, including the GOA and AI, and then into the BS and North Pacific and into the Russian waters and territories. However, based on biological information collected since the species was listed as threatened in 1990, NMFS has published a proposed rule in the Federal Register, (FR 51968; October 4, 1995) proposing to reclassify the Steller sea lion as two distinct population segments under the ESA. NMFS has proposed to classify the Steller sea lion populations from 144 W. long. (a line near Cape Suckling, AK) as endangered and to maintain the ESA threatened listing for the remainder of the U. S. populations. NMFS is requesting public comments on this proposed action through January 2, 1996.

As a result of ESA section 7 consultations on the effects of the North Pacific federally-managed groundfish fisheries, NMFS implemented additional protective measures in 1991, 1992 and 1993 to reduce the effects of certain commercial groundfish fisheries on Steller sea lion foraging (See 56 FR 28112, June 19, 1991; 57 FR 2683, January 23, 1992; and 58 FR 13561, March 12, 1993; current protections are codified at 50 CFR 672.24(e) and 675.24(f)(1994)). NMFS has also published a Steller Sea Lion Recovery Plan (Recovery Plan) (58 FR 3008, January 7, 1993), and has designated critical habitat for the species (58FR 45269, August 27, 1993). NMFS and other agencies are implementing the Recovery Plan.

The proximate cause of the Alaskan population decline appears to be chronically reduced juvenile survival coupled with episodic acute decline in adult survival.

Food limitation has been suggested as the most likely cause of the Steller sea lion populations decline in Alaska. Diets in all areas were dominated by one or two taxa, walleye pollock and atka mackerel were the dominate taxa changed from the east (pollock) to the west (atka mackerel). The remainder of the diet (25 percent) was made up primarily of forage fish species. As diet diversity increased populations declines decreased suggesting that sea lion need a variety of prey available, perhaps as a buffer to significant changes in abundance of any single prey (Ecosystem Consideration, SAFE, 1995). Juvenile sea lions consume, however, smaller and a less diverse assemblage of prey than adults. The size of walleye pollock consumed by adult sea lions averages to be fish that are between 1 and 3 years old (less than 30 cm).

Aside from changes in food limitation, disease, shooting and incidental takes also contribute to the decline of the steller sea lion population. Although, incidental takings has a relatively small proportion of juvenile animals were declines are most noted, shooting have decreased as a result of public awareness, and disease studies are continuing because disease is common within the populations at background levels and may become an important source of mortality when animals are stressed by other factors.

The Status Review of the United States Sea Lion (Eumetopias Jubatus) Population (1995) provides a review and summary of Steller Sea Lion research results.

Norther fur seals

Northern fur seals are currently listed as depleted under the Marine Mammal Protection Act (MMPA). Current assessments suggest that the size of the population has been relatively stable since the early 1980s (Antonelis et al., 1990). The decline evidenced in the 1960s and early 1970s was associated with commercial and scientific harvests in the 1950s and early 1960s (Swartzman and Hofman 1991). Cause(s) of the decline observed in the late 1970s are largely unknown, but may be related to entanglement in marine debris and discarded fishing gear, incidental take, or reduced prey availability. Although the northern fur seals range is throughout the North Pacific Ocean, they only breed at a few sites (Commander, Bogoslof and Pribilof Islands in the Bering Sea). During 1994 regulations were implemented at § 675.24 to create a Pribilof Island Area Habitat Conservation Zone, in part, to protect the Northern fur seals.

Pacific harbor seals

NMFS, in cooperation with ADF&G, is conducting a statewide population assessment of northern harbor seals in Alaska. Counts from these surveys suggest that the number of seals in Bristol Bay has remained somewhat steady. Counts in the Central and Western GOA indicate that a significant decline in harbor seal abundance continues. The causes of the harbor seal decline in the central and western GOA are unknown, but research over the coming years, by ADF&G and NMFS will study possible mechanisms as well as stock structure to see why they are declining so rapidly in some areas, but are stable in others. Although there is no current listing of harbor seals as depleted under the MMPA, a Conservation Plan is being drafted.

Killer whales

Killer whales are observed in all major oceans and seas of the world and appear to be increasing in abundance. Killer whales are top-level carnivores of the marine ecosystem with diets that vary regionally. Killer whales are primarily fish eater, however, are known to prey on other cetaceans, pinnipeds and seabirds. Killer whales may feed upon fish when stocks are in local abundance and then switch to marine mammals when fish are less available.

3.1.3 Seabirds

Alternatives 1 and 2 are expected to have unknown effect on seabirds but are not expected to jeopardize their continued existence. The USFWS has management responsibility for seabirds in Alaska. It has prepared a Alaska Seabird Management Plan for purposes of developing seabird management strategies. The status and trends of seabird populations in Alaska from that plan are summarized below.

Declines in kittiwake and murre populations have occurred in the Pribilof Island area since at least the mid-1970s (Hatch, 1993). Preliminary results from summer 1995 survey at St.Paul and St. George islands indicated that kittiwake nesting success was again very low.

Declines for common murres black-legged kittiwakes, marbled and Kittlize's murrelets, cormorants and horned puffins were also noted.

The most numerous breeding seabirds in Alaska are northern fulmars, storm-petrels, kittiwakes, murres, auklets, and puffins. These groups, and others, represent 38 species of seabirds that breed in Alaska. Eight species of Alaska seabirds breed only in Alaska and Siberia. Populations of five other species are concentrated in Alaska but range through the North Pacific region. The marine waters off Alaska provide critical feeding grounds for two types of seabirds in observed: (1) birds that breed in other areas in the boreal winter and migrate to Alaska in the boreal summer (albatrosses and shearwaters); and (2) birds that breed in other areas in the boreal summer and spend the boreal winter in Alaska.

More detailed information pertaining to seabirds can be found in the seabirds section of the Ecosystem Chapter in the Preliminary 1996 SAFE document dated September, 1995. This document will be updated at the November, 1995 Plan Teams meeting.

Endangered Species

Short-tailed albatross	Diomedea albatrus

Threatened Species

Spectacled eider	Somateria fischeri

Other species that are not presently listed but that are categorized by the U.S. Fish and Wildlife Service as candidate species are as follows:

Steller's eider	Polysticta stelleri
Marbled murrelet	Brachyramphus marmoratus
Red-legged kittiwake	Rissa brevirostris
Kittlitz's murrelet	Brachyramphus brevirostris

Seabirds: Formal consultation was concluded on the effects of the NMFS Interim Incidental Take Exemption Program on the short-tailed albatross and other species listed under the ESA and under the jurisdiction of the U.S. Fish and Wildlife Service (FWS) on July 3, 1989. That consultation concluded that BSAI and GOA groundfish fisheries would adversely affect the short-tailed albatross and would result in the incidental take of up to two birds per year, but would not jeopardize the continued existence of that species. Subsequently, Section 7 consultation has been reinitiated for major changes to the FMP or fishery that might affect the short-tailed albatross; these have been informal consultations, and have concluded that no additional adverse impacts beyond those in the aforementioned formal consultation would occur. These subsequent informal consultations include: (1) 1992 BSAI and GOA TAC specifications, January 17, 1992; (2) 1993 BSAI and GOA TAC specifications, February 1, 1993, and clarified February 12, 1993; (3) delay of the second quarter pollock fishing season in the GOA, December 22, 1992; (4) careful release of halibut in hook-and-line fisheries, March 12, 1993; (5) delay of the second pollock fishing seasons in the BSAI and GOA, March 12, 1993; (6) BSAI Amendment 28, April 14, 1993; (7) GOA Amendment 31, July 21, 1993; (8) 1994 BSAI and GOA TAC specifications, February 14, 1994; (9) Experimental Trawl Fishery, Kuskokwim Bay to Hooper Bay, June 22, 1994; and (10) 1995 BSAI and GOA TAC specifications, February 7, 1995. Following the taking of a short-tailed albatross in August 1995, NMFS requested reinitiation of consultation on the 1995 BSAI and GOA TAC specifications on September 8, 1995.

NMFS will reinitiate consultation if allowable incidental takes of listed species are exceeded, if new information on fisheries effects on listed species becomes available, if the subject fisheries are significantly modified, including increases in TAC specifications exceeding 10%, or if new listings occur of species or of designations of critical habitats that may be affected by the fisheries.

3.1.4 Pacific salmon

Five species of Pacific salmon occur off Alaska and might occur as incidental catch in groundfish fisheries: chinook salmon, _Oncorhynchus tschawytscha_; coho salmon, _O. kisutch_; sockeye salmon, _O. nerka_; chum salmon _O. keta_; and pink salmon _O. gorbuscha_. Of these species, several populations have been listed under the ESA. Snake River sockeye were listed as endangered (November 20, 1991), and Snake River spring/summer and fall chinook were listed as threatened (April 22, 1992). A fourth species, winter-run chinook from the Sacramento River, was listed as threatened (November 5, 1990) but is not believed to migrate into the GOA. Effects of the GOA and BSAI groundfish fisheries on listed salmon were considered by informal consultations with the NMFS Northwest Region for fishing years 1993 (April 21, 1993) In addition to the environmental assessment document on the fisheries, the Alaska Region wrote a biological assessment (March 17, 1993) and the decisional document that accompanied the April 21, 1994 memorandum concluding that salmon species listed under the ESA were not likely to be adversely affected by the 1994 TACs, or by a change of the non-roe pollock season in the BSAI. Subsequent informal section 7 consultation occurred for BSAI Amendment 28 (June 7, 1993), and for GOA Amendment 31 (September 22, 1993).

Consultation was re-initiated for the groundfish fisheries in 1995 for the 1996 TAC specifications. A Biological Assessment written by the NMFS Alaska Regional office was sent to the NMFS Northwest Region on November 16, 1993. Finalization of the Biological Opinion on incidental take provisions was signed by the Assistant Administrator for Fisheries, which determined that the proposed fishing activities were not likely to jeopardize the continued existence of endangered or threatened Snake River salmon species.

The following are species that are currently listed under the ESA that are present in the BSAI and GOA management areas:

Endangered Species

Snake River sockeye salmon	Oncohynchus nerka

Threatened Species

Snake River fall chinook salmon	Oncorhynchus tshawytscha
Snake River spring/summer chinook salmon	Oncorhynchus tshawytscha

Effects of the GOA and BSAI groundfish fisheries on listed salmon were considered by informal consultations with the NMFS Northwest Region for fishing years 1992 and 1993 (February 20, 1992, April 21, 1993, respectively).

Formal consultation was done for the federal fishing proposal for fishing year 1994 and future years. The Alaska Region wrote the biological assessment (November 16, 1993) containing a description of anticipated fishing activities conducted under the FMPs, including the annual specification amount for 1994 and estimated potential takings (portion of salmon bycatch) by the fishery of the listed salmon. The

Biological Opinion was issued January 19, 1994. In it NMFS made the determination that the proposed action would not jeopardize the continued existence of listed salmon species. Conservation measures were recommended to reduce salmon bycatch in the fisheries and improve the level of information about the salmon bycatch. The no jeopardy determination was based on the assumption that if total salmon bycatch is controlled, the impacts to listed salmon will be also. Compliance with the Biological Opinion is stated in terms of limiting salmon bycatch to under 40,000 for chinook salmon in either fishery and 200 and 100 sockeye salmon in the BSAI and GOA fisheries, respectively.

Consultation must be reinitiated if: the amount or extent of taking specified in the Incidental Take Statement is exceeded; new information reveals effects of the action that may affect listed species in a way not previously considered; the action is subsequently modified in a manner that causes an effect to listed species that was not considered in the biological opinion; or, a new species is listed or critical habitat is designated that may be affected by the action.

The listing status of Snake River fall chinook and Snake River Spring/Summer chinook has changed twice since the 1994 Biological Opinion was issued. The first change was by emergency rule (August 18, 1994) from Threatened to Endangered. That listing was temporary pending a final rule which the Department of Commerce was unable to file. Therefore, the status reverted back to Threatened on April 17, 1995.

The Alaska Region advised the NMFS Northwest Region by January 25, 1995, and August 17, 1995, memorandums (with data tables) that chinook salmon bycatch estimates from the BSAI exceeded 40,000 fish during previous harvest years. As yet, the Northwest Region has not responded. They may issue an amendment to the 1994 biological opinion or the information may be considered in preparation of a NMFS comprehensive biological opinion for harvest. No additional consultation with the Northwest Region on listed salmon is necessary for the 1996 groundfish fishery unless the action is subsequently modified in a manner that causes an effect to listed species that was not considered in the 1994 biological opinion.

Regulatory actions that support the reduction of incidental Chinook salmon takes include the publication of a proposed rule (60 FR 46811, September 8, 19950 to limit the amounts of salmon taken in specified areas of the BS to 48,000 fish.

3.1.5 Predator/prey relationships

Marine ecosystems in the BSAI and GOA are complex webs of predator/prey relationships. Since the status of each component stock in the groundfish complex in these management areas may change from year to year, even under the status quo alternative, predator/prey relationships are also expected to vary.

Fish food habits research conducted by the Alaska Fishery Science Center in the BS provides information on which fish species utilize the same food sources and which fish species are predators of other fishes. This research also outlines the size ranges of prey consumed by fish predators. An overview of this information and references to other studies is found in Livingston et al., (1986), Brodeur and Livingston (1988), Livingston (1991a, 1993), Livingston et al. (1993), and Yang (1993).

A synopsis of prey consumed by many of the target groundfish categories is in Attachment 2 of the 1995 Final EA. The available information on predator/prey relationships often pertains to either the GOA or the BSAI ecosystem. It is assumed that impacts on predator/prey relationships in each ecosystem would differ in terms of affected species and magnitudes. A general overview of predator/prey relationships in the two management areas follows.

Mortality sources by prey age for yellowfin sole, Pacific herring, Pacific cod, and pollock in the BSAI have been evaluated (Laevastu and Favorite 1977, Livingston 1991a, 1993, Livingston et al. 1993). Although the actual magnitude of the removal at age by fish, mammals, and the fishery depends on population size of the predators and size distribution of prey in a given year, most fish, seabird, and northern fur seal predators generally consume the youngest prey while other marine mammals, Pacific cod, and Pacific halibut tend to take slightly older (and larger) prey. The fishery takes the largest fish of any particular species.

3.1.6 Socioeconomic summary

The most recent description of the groundfish fishery is contained in the Economic Status of the Groundfish Fisheries Off Alaska, 1994, (Kinoshita et al. 1995). The report includes information on the catch and value of the fisheries, the numbers and sizes of fishing vessels and processing plants, and other economic variables that describe or affect the performance of the fisheries.

For purposes of this analysis, the types of socioeconomic impacts of Alternatives 1 and 2 are those related to gross earnings by the fishing fleet and impacts on bycatch management of prohibited species. Summarized below are 1994 production of groundfish products for each of the target species categories, a description of the groundfish fishing vessels in 1995, and a synopsis of the current bycatch management regime.

3.1.6.1 Summary of 1994

Each year, as part of the annual SAFE Report, as chapter entitled Economic Status of the Groundfish fisheries off Alaska is produced for the preliminary and final SAFE Report. A preliminary chapter was produced at the Plan Teams September 1995 meeting. This chapter will be updated at the November, 1995 Plan Team meeting. The following summary provides the latest information describing the groundfish fisheries off Alaska.

Catch in the domestic groundfish fishery in 1994 totaled 2.24 million metric tons, up 4 percent since 1993. The ex-vessel value of the fishery, excluding the value added by at-sea processing, increased from $414 million in 1993 to 439 million in 1994, the value of the resulting products increased from 1.0 to 1.14 million, and the value of groundfish exports from the Pacific Northwest, which consists principally of products from the Alaska groundfish fisheries, increased from 833 million to 862 million.

Table 4.--Production of groundfish products in the fisheries off Alaska by species, 1990-94, quantity in metric tons, product weight and value in million dollars.

Species/ Product	1990 Quantity	1990 Value	1991 Quantity	1991 Value	1992 Quantity	1992 Value
Pollock						
Whole	1,356	$ 1.1	2,001	$ 0.8	3,782	$ 2.6
H & G	3,315	3.0	3,053	2.7	3,885	2.9
Fillets	74,879	171.4	72,164	214.6	42,320	111.2
Minced	13,553	15.8	10,742	16.8	14,811	15.8
Surimi	177,099	277.2	139,844	452.2	162,786	537.8
Roe	12,715	96.9	21,651	213.8	17,509	198.8
Fish meal	57,180	31.6	57,306	32.2	59,920	30.5
Other	4,318	0.9	7,214	1.1	8,339	1.9
Total		597.8		934.2		901.6
Pacific cod						
Whole	22,547	21.3	22,860	25.1	10,404	10.0
H & G	65,382	117.8	63,661	125.7	68,257	118.0
Fillets	16,827	60.4	18,329	91.4	14,941	66.0
Salted	10,387	35.7	11,241	43.1	4,659	16.1
Other	5,998	10.5	8,985	10.8	8,705	11.7
Total		245.4		296.1		221.8
Sablefish						
H & G	18,495	85.0	15,567	94.0	14,838	91.7
Other	222	1.0	571	2.0	267	0.8
Total		86.0		96.0		92.5
Flatfish						
Whole	11,870	17.1	34,436	27.4	30,585	21.2
H & G	19,295	38.9	28,407	64.6	33,813	55.4
Fillets	1,007	4.2	1,198	5.4	3,219	10.6
Kirimi	1,676	2.9	14,915	43.1	14,115	17.2
Other	85	0.0	1,676	2.4	2,036	1.6
Total		63.2		142.8		106.0
Rockfish						
Whole	917	2.0	4,647	6.4	2,439	3.1
H & G	22,595	51.8	8,364	16.1	14,591	31.8
Other	307	0.8	311	0.4	249	0.5
Total		54.5		22.8		35.5
Atka mackerel						
Whole	2,039	4.2	3,798	5.2	11,531	12.8
H & G	11,041	21.7	11,264	23.3	19,536	32.5
Other	5	0.0	245	0.1	977	2.1
Total		25.9		28.6		47.4
Total		$1,072.8		$1,520.4		$1,404.8

Table xx.--Continued.

Species/ Product	1993 Quantity	1993 Value	1994* Quantity	1994* Value
Pollock				
Whole	4,354	$ 2.7	1,552	$ 1.1
H & G	1,342	0.9	945	0.7
Fillets	67,755	150.0	60,698	136.2
Minced	16,274	14.5	13,686	11.3
Surimi	150,288	254.5	181,957	375.1
Roe	11,933	145.6	12,194	154.7
Fish meal	53,952	27.0	54,789	26.9
Other	11,537	2.4	12,794	3.9
Total		597.5		709.9
Pacific cod				
Whole	10,857	10.5	5,874	3.9
H & G	37,333	61.1	51,807	88.0
Fillets	12,537	47.4	13,420	39.4
Salted	6,598	16.5	4,325	6.7
Other	7,211	8.5	8,988	12.8
Total		144.1		150.8
Sablefish				
H & G	16,315	97.7	16,140	101.5
Other	97	0.1	576	3.2
Total		97.8		104.7
Flatfish				
Whole	28,752	22.0	43,312	30.0
H & G	36,510	43.4	30,274	63.4
Fillets	2,035	5.8	1,672	3.7
Kirimi	12,835	30.0	17,519	25.5
Other	1,312	0.7	1,878	1.6
Total		101.8		124.2
Rockfish				
Whole	5,324	5.0	3,228	1.9
H & G	11,581	30.7	9,442	15.3
Other	188	0.6	123	0.4
Total		36.3		17.6
Atka mackerel				
Whole	14,184	11.7	9,575	7.4
H & G	24,737	43.3	23,750	21.9
Other	31	0.0	1,486	2.2
Total		55.0		31.4
Total		$1,032.5		$1,138.6

H & G - Headed and gutted. Kirimi - Sliced fish. * - Preliminary.
Source: National Marine Fisheries Service, Alaska and Northwest Regions.

3.1.6.2 Description of the 1994 groundfish fishing fleet

NMFS blend estimates and fish ticket data was examined to determine the current composition of the domestic groundfish fishing fleet. A total of 2,077 vessels received ground active in the groundfish fisheries in the BSAI and GOA in 1994. Fishing operations in which these vessels participate include harvesting only, harvesting and processing and processing only. Information showing vessel length classes by area are shown in the following table:

Table xx.--Number of vessels that landed groundfish in the domestic fisheries off Alaska by area, gear, and vessel length class, 1986-94.

Gear/Length (feet)		1986	1987	1988	1989	1990	1991	1992	1993	1994
					Gulf of Alaska					
Hook&Line										
	< 60	835	1,476	1,370	1,196	1,409	1,624	1,648	1,373	1,500
	60-84	89	136	114	103	131	144	144	122	144
	85-109	15	19	14	10	15	29	37	25	35
	110-134	4	6	7	10	13	8	23	22	17
	135-159	1	2	0	0	3	1	8	7	7
	160-184	1	1	4	4	5	2	9	8	8
	> 184	0	0	0	1	5	0	2	3	1
	Unknown	20	31	20	28	29	34	33	53	66
Pot										
	< 60	5	10	34	17	60	111	160	85	81
	60-84	8	4	1	1	27	42	45	25	20
	85-109	5	3	6	2	10	10	10	3	9
	110-134	1	1	2	0	3	1	3	0	1
	135-159	0	0	1	0	0	1	7	1	2
	160-184	2	1	2	1	1	0	4	0	0
	> 184	0	1	0	0	1	0	2	0	1
	Unknown	0	2	0	1	1	2	3	0	6
Trawl										
	< 60	18	35	37	31	43	45	62	72	62
	60-84	14	30	31	35	42	55	57	50	38
	85-109	10	19	18	24	23	30	29	26	26
	110-134	9	14	19	18	24	29	31	19	23
	135-159	2	4	3	4	7	7	9	8	7
	160-184	3	6	6	7	11	11	13	7	11
	> 184	3	4	6	14	23	34	23	16	12
	Unknown	2	1	2	2	1	3	10	8	10
Other										
	< 60	3	21	13	3	24	8	13	25	0
	60-84	0	0	0	0	3	1	1	3	0
	85-109	1	0	0	0	3	0	1	1	0
	110-134	0	0	1	0	0	0	0	0	0
	135-159	0	0	0	0	0	0	1	1	0
	160-184	0	0	0	0	1	0	0	0	0
	> 184	0	0	0	0	1	0	0	0	0
	Unknown	3	3	1	0	2	2	0	0	0
All Gear										
	< 60	850	1,512	1,419	1,235	1,497	1,712	1,769	1,481	1,570
	60-84	107	160	141	135	167	198	213	169	168
	85-109	28	39	38	34	42	57	65	48	63
	110-134	14	19	28	28	39	37	54	39	41
	135-159	3	6	4	4	10	8	19	13	16
	160-184	6	7	11	12	16	13	24	15	19
	> 184	3	4	6	15	29	34	25	19	13
	Unknown	25	37	22	31	33	40	46	61	76

Table xx.--Continued.

Gear/Length (feet)		1986	1987	1988	1989	1990	1991	1992	1993	1994
					Bering Sea/Aleutian Islands					
Hook&Line										
	< 60	25	64	57	33	43	102	66	38	60
	60-84	29	44	33	28	32	46	40	27	23
	85-109	4	5	6	3	4	10	11	11	11
	110-134	1	3	8	9	12	17	22	21	15
	135-159	1	2	1	1	2	4	9	7	7
	160-184	0	1	4	3	7	12	14	12	9
	> 184	0	0	1	1	3	1	3	4	3
	Unknown	0	2	0	0	2	4	1	4	8
Pot										
	< 60	0	2	2	1	0	2	4	2	5
	60-84	2	0	1	1	1	6	9	4	8
	85-109	2	3	4	1	2	11	23	9	10
	110-134	3	3	2	0	1	11	11	6	8
	135-159	0	1	1	0	1	2	11	2	3
	160-184	2	2	2	2	5	6	12	1	2
	> 184	0	0	0	0	0	1	2	0	0
	Unknown	0	0	0	0	0	2	1	2	2
Trawl										
	< 60	2	6	5	9	5	2	9	10	3
	60-84	7	10	13	19	13	26	33	27	25
	85-109	11	14	18	25	14	27	24	22	19
	110-13	12	21	28	28	30	35	39	36	32
	135-159	3	4	4	5	6	9	8	9	8
	160-184	4	6	10	9	14	14	20	15	16
	> 184	3	7	22	30	45	49	46	40	45
	Unknown	3	6	1	4	8	7	12	17	11
Other										
	< 60	1	0	0	0	0	0	2	0	0
	60-84	0	0	0	0	0	0	0	0	0
	85-109	2	0	0	0	1	0	0	0	0
	110-134	1	0	0	0	0	1	2	0	1
	135-159	0	0	0	0	0	0	2	0	0
	> 184	0	0	0	0	1	0	1	0	1
	Unknown	0	1	0	0	0	0	0	0	0
All Gear										
	< 60	38	72	63	41	47	105	80	49	65
	60-84	15	53	47	47	45	77	74	58	55
	85-109	14	22	28	28	20	45	55	41	40
	110-134	4	25	37	37	43	59	64	60	54
	135-159	6	7	6	6	9	14	28	17	17
	160-184	3	9	16	14	26	29	38	26	27
	> 184	3	7	22	31	48	51	49	43	46
	Unknown	28	9	1	5	10	11	14	23	21

Table xx.--Continued.

Gear/Length (feet)		1986	1987	1988	1989	1990	1991	1992	1993	1994
					All Alaska					
Hook&Line										
	< 60	1,213	1,502	1,381	1,203	1,427	1,652	1,664	1,391	1,515
	60-84	91	139	115	103	133	147	148	126	147
	85-109	17	19	16	11	15	30	39	26	36
	110-134	4	7	9	12	14	18	30	25	18
	135-159	1	2	1	1	4	5	12	8	7
	160-184	1	2	5	4	7	12	17	12	9
	> 184	0	0	1	1	6	1	5	4	4
	Unknown	29	33	21	28	30	37	33	57	71
Pot										
	< 60	5	12	35	18	60	112	160	85	83
	60-84	8	4	2	2	28	46	48	25	25
	85-109	5	4	7	3	11	21	30	10	15
	110-134	4	4	3	0	3	11	12	6	8
	135-159	0	1	1	0	1	2	15	3	4
	160-184	2	3	3	2	6	6	14	1	2
	> 184	0	1	0	0	1	1	2	0	1
	Unknown	0	2	0	1	1	4	4	2	8
Trawl										
	< 60	20	39	40	36	46	47	66	78	62
	60-84	18	36	41	44	45	62	62	57	47
	85-109	15	27	29	42	28	37	32	32	30
	110-134	12	26	34	32	31	35	41	36	32
	135-159	3	4	4	5	7	9	10	11	8
	160-184	4	7	11	10	15	14	20	15	16
	> 184	3	8	22	30	45	50	46	40	45
	Unknown	5	6	3	6	8	8	19	24	14
Other										
	< 60	8	21	13	3	24	8	15	25	0
	60-109	3	0	0	0	7	1	2	4	0
	110-184	1	0	1	0	1	1	5	1	1
	> 184	0	0	0	0	1	0	1	0	1
	Unknown	3	4	1	1	2	2	0	0	0
All Gear										
	< 60	1,234	1,540	1,433	1,246	1,517	1,740	1,786	1,503	1,585
	60-84	113	168	150	144	172	210	218	179	184
	85-109	33	48	51	53	48	73	86	61	74
	110-134	18	33	45	44	47	60	72	64	56
	135-159	4	7	6	6	12	14	32	18	18
	160-184	7	11	18	16	27	29	41	26	27
	> 184	3	8	22	31	51	52	50	43	46
	Unknown	37	44	24	36	40	49	56	83	87

Note: Includes motherships, but does not include catcher boats delivering exclusively to motherships.

Source: Blend estimates and fish tickets, National Marine Fisheries Service, Alaska Region, P.O. Box 21668, Juneau, AK 99802-1668.

3.1.6.3 Current bycatch management regime

In the trawl and fixed gear groundfish fisheries, incidental (bycatch) species, including crab, halibut, herring, and salmon are taken along with targeted groundfish species. Conflicts arise when bycatch in one fishery reduces the amount of a species available for harvest in another fishery. The bycatch problem is a particularly contentious allocation issue because crab, halibut, herring, or salmon fishermen value the use of these species very differently than groundfish fishermen.

A description of the BSAI and GOA bycatch management measures and associated fishery bycatch apportionments follow; Table 4 shows bycatch limits and associated fishery bycatch allowances for 1996.

Bering Sea and Aleutian Islands Area

PSC limits of red king crab and C. bairdi Tanner crab in Bycatch Limitation Zones (50 CFR 675.2) of the BS subarea, and for Pacific halibut throughout the BSAI area are specified under § 675.21(a). At this time, the 1996 PSC limits are:

1. Zone 1 trawl fisheries, 200,000 red king crabs;
2. Zone 1 trawl fisheries, 1 million C. bairdi Tanner crabs;
3. Zone 2 trawl fisheries, 3 million C. bairdi Tanner crabs;
4. BSAI trawl fisheries, 3,775 mt mortality of Pacific halibut;
5. BSAI nontrawl fisheries, 900 mt mortality of Pacific halibut; and
6. BSAI trawl fisheries, 1,861 mt Pacific herring.

The PSC limit of Pacific herring caught while conducting any trawl operation for groundfish in the BSAI is 1 percent of the annual eastern Bering Sea herring biomass. At this time, the best estimate of 1996 herring biomass is 186,000 mt. This amount was derived using 1994 survey data and an age-structured biomass projection model developed by the Alaska Department of Fish and Game (ADF&G). Therefore, the proposed herring PSC limit for 1996 is 1,861 mt. This value is subject to change, pending an updated forecast analysis of 1995 herring survey data that will be presented to the Council by the ADF&G during the Council's December 1995 meeting.

Regulations under § 675.21(b) authorize the apportionment of each PSC limit into PSC allowances for specified fishery categories. Regulations at § 675.21(b)(1)(iii) specify seven fishery categories (midwater pollock, Greenland turbot/arrowtooth flounder/sablefish, rock sole/flathead sole/other flatfish, yellowfin sole, rockfish, Pacific cod, and bottom pollock/Atka mackerel/"other species"). Regulations at § 675.21(b)(2) authorize the apportionment of the nontrawl halibut PSC limit among three fishery categories (Pacific cod hook-and-line fishery, groundfish pot gear fishery, and other nontrawl fisheries). The PSC allowances for trawl and nontrawl are listed in Table 5. In general, the preliminary 1996 fishery bycatch allowances listed in Table 5 reflect the recommendations made to the Council by its AP. These recommendations are unchanged from 1995, except for halibut in the Greenland turbot/arrowtooth flounder/sablefish category. A halibut bycatch allowance equal to zero is proposed for this fishery category in 1996. The amount of halibut that had been apportioned to this fishery category in 1995 (120 mt) is proposed to be redistributed among the yellowfin sole, rocksole/flathead sole/other flatfish and the Pacific cod fishery categories. These allocations were based on last years final recommendations which incorporated 1993 and 1994 bycatch amounts, anticipated 1996 harvest of groundfish by trawl gear and fixed gear, and assumed halibut mortality rates in the different groundfish fisheries based on analyses of 1993-1994 observer data.

Regulations at § 672.21(b)(2) authorize exemption of specified non-trawl fisheries from the halibut PSC limit. As in 1995, the Council proposes to exempt pot gear and the hook-and-line sablefish fishery from the non-trawl halibut limit for 1996. The Council proposed this exemption because of the low halibut bycatch mortality experienced in the pot gear fisheries (7 mt in 1995) and because of the 1995 implementation of the sablefish and halibut Individual Fishing Quota (IFQ) program, which would allow legal-sized halibut to be retained in the sablefish fishery.

TABLE 4. Preliminary 1996 Prohibited Species Bycatch Allowances for the BSAI Trawl and Nontrawl Fisheries.

Trawl Fisheries	Zone 1	Zone 2	BSAI-wide
Red king crab, number of animals			
yellowfin sole	50,000		
rcksol/otherflat/flathead sole	110,000		
rockfish	0		
turb/arrow/sab(2)/rockfish	0		
Pacific cod	10,000		
plck/Atka/othr(3)	30,000		
Total	200,000		
C. bairdi Tanner crab, number of animals			
yellowfin sole	225,000	1,525,000	
rcksol/oth.flat/flathead sole	475,000	510,000	
turb/arrow/sabl	0	5,000	
rockfish	0	10,000	
Pacific cod	225,000	260,000	
plck/Atka/othr	75,000	690,000	
Total	1,000,000	3,000,000	
Pacific halibut, mortality (mt)			
yellowfin sole			790
rcksol/oth.flat			730
turb/arrow/sabl			0
rockfish			110
Pacific cod			1,590
plck/Atka/othr			555
Total			3,775
Pacific herring, mt			
midwater pollock			1,345
yellowfin sole			315
rcksol/oth.flat			0
turb/arrow/sabl			0
rockfish			8
Pacific cod			24
plck/Atka/othr(4)			169
Total			1,861

TABLE 5. (con't) Preliminary 1996 Prohibited Species Bycatch Allowances for the BSAI Trawl and Nontrawl Fisheries.

Nontrawl fisheries	BSAI-wide
Pacific halibut, mortality (mt)	
Pacific cod Hook-and-line	725
Other nontrawl	175
Sablefish hook-and-line gear	Exempt
Groundfish pot gear	Exempt
Total	900

(2) Greenland turbot, arrowtooth flounder, and sablefish fishery category.
(3) Pollock, Atka mackerel, and "other species" fishery category.
(4) Pollock other than midwater pollock, Atka mackerel, and "other species" fishery category.

At its September 1995 meeting, the Council recommended that the proposed halibut bycatch allowances listed in Table 5 be apportioned seasonally as shown in Table 6. The prohibited species bycatch allowances and the seasonal apportionment of those allowances will be subject to change at the December 1995 Council meeting, pending public comments, year-to-date information on bycatch performance and updated information on anticipated fishing patterns in 1996.

For purposes of monitoring the fishery halibut bycatch mortality allowances specified in Table 5, the Regional Director will use observed halibut bycatch rates and reported and observed groundfish catch to project when a fishery's halibut bycatch mortality allowance is reached. The Regional Director monitors the fishery bycatch mortality allowances using assumed mortality rates that are based on the best information available.

TABLE 6. Proposed Seasonal Apportionments of the 1996 Pacific Halibut Bycatch Allowances for the BSAI Trawl and Nontrawl Fisheries.

Fishery	Seasonal bycatch allowances (mt halibut)
Trawl Gear	
Yellowfin sole	
Jan. 20 - Jul. 31	295
Aug. 1 - Dec. 31	495
Total	790
Rock sole/flathead sole/"other flatfish"(1)	
Jan. 20 - Mar. 31	453
Apr. 1 - Jun. 30	190
Jul. 1 - Dec. 31	87
Total	730
Turbot/arrowtooth flounder/sablefish	
Total	0
Rockfish	
Jan. 20 - Mar. 31	30
Apr. 1 - Jun. 30	60
Jul. 1 - Dec. 31	20
Total	110
Pacific cod	
Jan. 20 - Jun. 30	1,487
Jul. 1 -Dec. 31	103
Total	1,590
Pollock/Atka mackerel/"other species"	
Jan. 20 - Apr. 15.	455
Apr. 16 - Dec. 31	100
Total	555
Total Trawl Halibut Mortality	3,775

TABLE 6. (Continued) Proposed Seasonal Apportionments off the 1996 Pacific Halibut Bycatch Allowances for the BSAI Trawl and Nontrawl Fisheries.

Fishery	Seasonal bycatch allowances (mt halibut)
Nontrawl Gear	
Pacific cod	
Jan. 1 - Apr. 30	475
May. 1 - Aug. 31	40
Sep. 1 - Dec. 31	210
Total	725
Other nontrawl	175
Sablefish hook-and-line	exempt
Groundfish pot	exempt
Total Nontrawl Halibut Mortality	900

(C) Time and area closures. The FMPs authorize the interim closure of times and areas to reduce prohibited species bycatch rates (Table 6). In general, these closures would be implemented under a framework established by regulatory amendment.

TABLE 7. Closures To Directed Fishing Under 1996 Interim TACs.

FISHERY (ALL GEAR)	CLOSED AREA
Pollock in Bogoslof District	Statistical Area 518
Pacific ocean perch	Bering Sea, Eastern AI Central AI Western AI
Shortraker/rougheye rockfish	AI
Other rockfish[2]	BSAI
Other red rockfish[3]	Bering Sea
Rockfish, Greenland turbot/ arrowtooth/sablefish	Zone 1
Arrowtooth	BSAI

Gulf of Alaska

Proposed Halibut PSC Mortality Limits

Under § 672.20(f), annual Pacific halibut PSC mortality limits are established for trawl and hook-and-line gear and may be established for pot gear. At its September meeting, the Council recommended that NMFS re-establish the PSC limits of 2,000 mt for the trawl fisheries and 300 mt for the hook-and-line fisheries, with 10 mt of the hook-and-line limit allocated to the DSR fishery in the Southeast Outside District and remainder to the other hook-and-line fisheries.

Regulations at § 672.20(f)(1)(ii) authorize exemption of specified non-trawl fisheries from the halibut PSC limit. As in 1995, the Council proposes to exempt pot gear and the hook-and-line sablefish fishery from the non-trawl halibut limit for 1996. The Council proposed these exemptions because of the low halibut bycatch mortality experienced in the pot gear fisheries (16 mt in 1995) and because of the 1995 implementation of the sablefish and halibut Individual Fishing Quota (IFQ) program, which would allow legal-sized halibut to be retained in the sablefish fishery. The trawl fishery apportionment of the 1996 halibut bycatch mortality limit (2,000 mt) remains unchanged from 1995. Under § 672.20(f)(1)(B) the trawl halibut bycatch mortality limit is apportioned between trawl fisheries for deep-water and shallow-water species. These apportionments are divided seasonally to avoid seasonally high halibut bycatch rates.

NMFS preliminarily concurs in the Council's 1996 recommendations for halibut bycatch limits and apportionments (Table 8). Some changes may be made in the seasonal, gear type and fishing-complex apportionments of halibut PSC limits for the final 1996 specifications. NMFS considers the following types of information as presented by, and summarized from, the preliminary 1995 SAFE Report, or from public comment and testimony.

TABLE 8. Proposed 1996 Pacific Halibut PSC Limits, Allowances, and Apportionments. The Pacific halibut PSC limit for hook-and-line gear is allocated to the demersal shelf rockfish (DSR) fishery and fisheries other than DSR. Values are in metric tons.

Trawl gear		Hook-and-line gear			
		Other than DSR		DSR	
Dates	Amount	Dates	Amount	Dates	Amount
Jan 1-Mar 31	600 (30%)	Jan 1-May 14	242 (83%)	Jan 1-Dec 31	10 (100%)
Apr 1-Jun 30	400 (20%)	May 15-Aug 31	29 (10%)		
Jul 1-Sep 30	600 (30%)	Sep 1-Dec 31	19 (6.5%)		
Oct 1-Dec 31	400 (20%)				
Total:	2,000 (100%)		290 (100%)		10 (100%)

Bering Sea and Aleutian Islands Area and Gulf of Alaska

(A) Gear restrictions. Gear restrictions are specified to reduce bycatch or bycatch mortality of halibut. Restrictions include (a) requiring biodegradable panels on groundfish pots, (b) requiring halibut exclusion devices on groundfish pots, and (c) revised specifications for pelagic trawl gear that constrains the pelagic trawl fisheries for groundfish to a trawl gear configuration designed to enhance escapement of halibut and crab during trawl operations.

(B) Industry Funded Domestic Observer Program. Regulations require operators of catcher vessels and catcher/processor vessels to obtain either 100, 30, or 0 percent observer coverage during each calendar quarter, depending on the size of the vessel. Shoreside and mothership processors are required to have either 100, 30, or 0 percent observer coverage during a month, depending on how groundfish is received during that month.

Vessel Requirements

Size of vessel length overall (LOA)	Observer coverage
0 - 59 feet (17.98 m)	0 percent
60 - 124 feet (37.80 m)	30 percent
> 124 feet (37.80 m)	100 percent

Processor Requirements

Groundfish receive during a month	Observer coverage
0 - 499 mt	0 percent
500 - 999 mt	30 percent
1,000 mt or more	100 percent

Operators of vessels less than 60 feet (18.2 m) LOA and mothership and shoreside processors that receive less than 500 mt groundfish during a month are not required to obtain an observer unless specifically requested to do so by NMFS.

Observer data on prohibited species bycatch rates are applied against industry reported groundfish catch to derive estimates of accrued halibut bycatch on a weekly basis. Actual procedures used by NMFS to calculate halibut bycatch amounts may be obtained from the Fisheries Management Division, Alaska Region (see 6.0 List of Preparers).

NMFS issued a final rule (September 6, 1994; 59 FR 46126) to implement the North Pacific Fisheries Research Plan (Research Plan) for the GOA and BSAI groundfish fisheries. The Research Plan will provide an industry-funded observer program and promote management, conservation, and scientific understanding of groundfish, halibut and crab resources off Alaska.

Under the Research Plan, the same observer coverage percentages will be applicable through December 31, 1995. For more information see 59 FR 46126 published September 6, 1994.

(C) Assumed halibut mortality rates. NMFS will use assumed halibut mortality rates for 1996 groundfish fisheries based on the best available information.

(D) Vessel Incentive Program. Regulations implementing a vessel incentive program to reduce halibut bycatch in the groundfish trawl fisheries are set forth at § 672.26 and § 675.26 was effective May 6, 1991, and was expanded in 1992 to include all BSAI and GOA operators of trawl fisheries. Under the vessel incentive program, individual trawl vessels are held accountable for their observed bycatch rates of halibut when they participate in any trawl fishery in the BSAI or GOA. Vessel operators are accountable for their bycatch of red king crab when they participate in the BS rocksole/other flatfish fishery. If a trawl vessel's bycatch rate at the end of a month exceeds a specified bycatch rate standard, the vessel owner/operator will be subject to prosecution under the Magnuson Act.

Bycatch rate standards are annually specified based on a list of criteria set forth in regulations (50 CFR 672.26 and 675.26).

(E) Industry Recordkeeping and Reporting Requirements. Groundfish catcher vessels and processors are required to maintain daily records of groundfish catch and discard amounts of prohibited species and groundfish. Groundfish processors are also required to record groundfish production amounts and report to NMFS weekly production and discard amounts. When requested to do so by NMFS, processors must also submit this information on a daily basis to enhance inseason monitoring of groundfish quotas and/or prohibited species bycatch allowances.

(F) Additional Fishery Management Actions are summarized in the 1996 SAFE under a chapter entitled Fishery Management Actions.

3.2 Physical and biological impacts

Alternative 1 - Status Quo: Implement 1996 TACs that are unchanged from 1995 final specifications of TAC.

Under this alternative, the sum of the BSAI and GOA TACs during 1996 would be the same as those specified for the 1995 groundfish fisheries in the BSAI and GOA (2,000,000 and 279,463 mt, respectively).

Alternative 2: Implement 1996 TACs equivalent to proposed TACs recommended by the Council at its September, 1995 meeting.

Under this alternative, the sum of the BSAI and GOA TACs would be 2,000,000 mt and 267,917 mt, respectively.
Under this alternative, the sum of the BSAI and GOA proposed TACs would be 2,000,000 mt and 267,917 mt, respectively.

Physical impacts under Alternatives 1 and 2 are those that would be caused by (1) trawling activity on the sea bed and associated benthos (i.e., attached animals and plants) and (2) deposition of fish wastes resulting from processing activities. Some disturbance to the benthic environment occurs in all trawl fisheries. Based on recent catch data, substantial amounts of pollock, representing 66 and over 34 percent of the total BSAI and GOA groundfish TACS, respectively, might be harvested with pelagic trawl gear, which is expected to impact the benthic environment less than bottom trawl gear. The total extent of physical impacts is unknown. Fishing effort is disbursed throughout the management areas and over the fishing year, either by efforts to improve catch-per-unit of effort or by regulation.

Biological impacts on the environment are those caused by changes in the status of target species categories of groundfish, other groundfish species, marine mammals including Steller sea lions and harbor seals, birds, and other predators and prey. These impacts are discussed below.

3.2.1 Impacts on groundfish

3.2.1 Impacts on groundfish

The levels of TAC that are implemented in 1996, as in 1995, will be within the guidelines of the ABCs, Overfishing Levels, and Optimum Yields. The ABCs are set on the basis of the best scientific information on each stock's abundance, distribution, life history, and commercial fishing history as discussed in detail in the SAFE, and is less than or equal to the respective OFL. Therefore, the sums of TACs and ABCs for 1996 are less than the sum of 1996 OFL. Neither alternative is anticipated to have significant effects on groundfish stocks, because groundfish removals under either alternative do not exceed overfishing levels. Furthermore, in some cases the TAC established is substantially below the ABC level because of uncertainty in stock assessments, for bycatch considerations and because of optimum yield limitations. Bycatch restrictions will likely curtail groundfish harvests short of the TACs in 1996.

3.2.2 Impacts on marine mammals, especially sea lions and harbor seals

Cetaceans

Formal consultation on the effects of the GOA groundfish fishery on listed cetaceans was concluded on April 19, 1991. The biological opinion issued for that consultation considered all aspects of the fishery and concluded that the fishery was unlikely to adversely affect listed cetaceans. The April 19, 1991, biological opinion on the effects of the BSAI groundfish fishery on listed species did not evaluate effects to listed cetaceans in any detail. Instead it incorporated by reference, an earlier biological opinion on the effects of the BSAI groundfish fishery on cetaceans, issued December 14, 1979, and the biological opinion issued July 5, 1989, on the marine mammal exemption program. The April 19, 1991, BSAI opinion reiterated the conclusion of these earlier opinions that the BSAI groundfish fishery was unlikely to jeopardize listed cetaceans. Unless there is some change in the GOA or BSAI fishery or information on cetaceans that would indicate an effect or relationship exists that we have not previously considered, it is not necessary to reinitiate consultation for these species.

The cetacean species discussed in Appendix 1 interact with trawl fisheries either through a common prey such as walleye pollock, cod, flatfish, or Atka mackerel (Lowry et al. 1989) or by occasionally being caught in trawl nets, currently at the rate of only several per year (NMFS unpublished data). The former includes all ten species while the latter includes only the six small to medium sized cetacean species.

Fish comprise varying proportions of the diet of large baleen whales, ranging from approximately 16 percent of the diet of fin whales, 29 percent of the diet of humpback whales, and 60 percent of the diet of minke whales (Perez and McAllister 1988). Fish ingested by the large baleen whales are almost exclusively small schooling fish, such as capelin, herring, and eulachon, or juveniles (not recruited to the fishery) of commercially exploited groundfish species, such as pollock, cod, and Atka mackerel. Therefore, direct competition between large baleen whales and fisheries is low. Spatial allocation of some groundfish TACs, such as pollock in the GOA and Atka mackerel in the AI, should decrease the likelihood of localized depletions of these species.

Fish generally comprise a greater proportion of the diet of the smaller cetaceans, with over 50 percent being reported for the killer whale, harbor porpoise, Dall's porpoise, and Beluga whale (Perez and McAllister 1988). These species are considered opportunistic and feed on a wide variety of fish species, including osmerids, clupeoids, gadids, salmonids, myctophids, flatfish, sand lance, and Atka mackerel. Killer whales have been documented to take fish off longlines in the AI and GOA black cod (sablefish) and Greenland turbot fisheries.

Pinnipeds

The potential adverse effects to Steller sea lions, northern fur seals, and Pacific harbor seals of the commercial groundfish fisheries in the BSAI and GOA include: (1) reduction of food availability (quantity and/or quality) due to harvest; (2) unintentional entanglement in fishing gear (incidental takes); (3) intentional harassment (including killing and wounding) of animals by fishermen; and (4) disturbance by vessels and fishing operations. Because the last two effects are less dependent on the level of the TAC, only the effects related to possible reductions in food availability and incidental takes will be considered further.

Food availability - Reduction in food availability, quality, and/or quantity is considered to be a possible factor in the sea lion decline (Calkins and Goodwin 1988, Merrick et al., 1987, Hoover 1988, Loughlin and Merrick 1989, Lowry et al 1989). The lack of detailed information on sea lions and their prey precludes a conclusive determination of how much, if any, changes in the availability of prey have contributed to the sea lion population decline. Data collected since the mid-1970s suggest that pollock and other gadid fish comprise a large portion (as much as 65 percent based on frequency of occurrence) of the sea lion's diet off Alaska (Pitcher 1981, Calkins and Pitcher 1982, Calkins and Goodwin 1988, Merrick et al., 1988). The sea lion diet is also comprised of a wide variety of other marine species. Representatives of at least 12 families of fish, as well as cephalopods (especially octopus, which occurred relatively frequently in the mid-1980s collections) and crustaceans have been observed in stomach contents of sea lions off Alaska (Calkins and Goodwin 1988). Based on recently obtained data from analyses of scat, Atka mackerel appears to be an important prey resource in the Aleutian Islands and the western Gulf of Alaska.

Recent analyses (ADF&G and NMFS, unpublished) have shown a strong similarity between the size composition of pollock ingested by adult Steller sea lions (> 4 years old) and the estimated size composition of the pollock population. Length-frequencies of pollock from sea lion stomachs and bottom trawl surveys conducted northwest of the Pribilof Islands in 1981 had single modes between 28-32 cm as well as similar ranges (7-61 cm in sea lion stomachs and 9-64 cm in surveys) and shapes. Pollock length-frequencies from stomachs collected from GOA sea lions and from GOA pollock population models were both bimodal, with one mode located at between 19-21 cm and a second between 45-51 cm. The strong similarity between the pollock size compositions ingested by sea lions and that estimated to be present in the population suggests that adult sea lions prey upon pollock size classes in proportion to their abundance. Consequently, the potential for overlap between fisheries and adult sea lions in their selection of pollock may be more dependent on the relative strength of recent pollock year classes than any inherent size-selection by adult sea lions. Pollock trawl fisheries in the GOA and BSAI catch primarily pollock larger than 30 cm (age 3+; Hollowed et al., 1991; Wespested and Dawson 1991). If the total pollock population is dominated in numbers by fish smaller than 30 cm (strong recruitment during 1 of the previous 2 years), then the fishery/sea lion overlap in pollock size may not be great. This was the situation in the BSAI during 1990-92 due to relative strong pollock year classes spawned in 1989 and 1990. However, if recent recruitment has been poor, such as is currently the situation in the GOA, adult sea lions and fisheries could be expected to overlap in their take of pollock. This does not imply that sea lions would necessarily be disadvantaged given the management restrictions imposed on trawl and pollock fisheries in the GOA and BSAI to protect sea lions. Very little information is available on the pollock size-selectivity of juvenile sea lions. However, the limited data available suggest they prefer smaller pollock than the adults.

As part of the analysis prior to implementing the emergency pollock fishery management measures in the GOA in 1991, NMFS concluded that spatial and temporal concentration of fishing effort in sea lion foraging areas could have reduced local abundances of prey stocks and adversely affected sea lions. For this reason, restrictions on trawl and pollock fisheries were imposed by emergency rule in June 1991, and are now permanent fishery management features in the BSAI and GOA under FMP amendments.

Incidental take - Incidental take of pinnipeds in groundfish fisheries has declined considerably since the early 1980s when several thousand were caught each year in gear. Observed takes of Steller sea lions, harbor seals, and northern fur seals incidental to fishing for groundfish in the BSAI and GOA totaled 18 (14, 1, and 3, respectively) in 1991, 22 (15, 4, and 3, respectively) in 1992, 8 (6, 1, and 1, respectively) in 1993.

Year-round trawl prohibitions within 10 nm of all BSAI sea lion rookeries, instituted in 1992, may have decreased the incidental takes of sea lions. In 1991, the Atka mackerel fishery caught over 80 percent of its target catch within 10 nm of sea lion rookeries in the AI. Six of the 14 observed takes of sea lions in 1991 were taken by the Atka mackerel fishery. In 1992, Atka mackerel trawl vessels fished outside 10 nm of sea lions rookeries and had no observed takes of sea lions. Levels of incidental take in 1991-93 by the groundfish fisheries were much lower than those observed as recently as the mid-1980s (Perez and Loughlin 1990). Declining levels of incidental take could reflect greater awareness on the part of fishermen in avoiding the capture of sea lions, reduced population sizes of the three pinnipeds, and the regulations imposed on groundfish fisheries.

1996 TAC specifications

Of the TAC specifications (mt) for 1995, the following are important relative to marine mammal concerns:

		1995 TAC	1996 TAC	Difference
GOA:	Pollock	65,360	52,700	- 12,660 (-19 %)
	Pacific cod	69,200	65,000	- 4,200 (-7 %)
	Atka mackerel	3,240	3,240	0
EBS:	Pollock	1,250,000	1,250,000	0
AI:	Pollock	56,600	56,600	0
BSAI:	Pacific cod	250,000	250,000	0
	Atka mackerel	80,000	80,000	0

Other Management Actions in the Bering Sea and Aleutian Islands and the Gulf of Alaska

Additional Management actions are summarized in the annual SAFE document under a section entitled Schedule of Federal Register Actions, Alaska Region, 1995.

Analysis of Alternatives

Alternative 1 would not take into account the most current information available on the status of groundfish species populations, including the declining GOA pollock population. Adoption of the 1995 TACs in 1996 would result in a level of fishing that is same as recommended for 1995 for BSAI, and higher in the GOA. Despite some lower TACs in 1995 than in 1996, it is unlikely that Alternative 1 would adversely affect marine mammals.

Alternative 2 would take into account the most current information regarding the status of individual groundfish species populations. Management measures are in place to reduce the likelihood of localized depletions of prey resources for marine mammals.

3.2.3 Impacts on seabirds

General concerns

Impacts of fishing activity on marine birds occurs through direct mortality from (a) collisions with vessels, (b) entanglement with fishing gear, (c) entanglement with discarded plastics and other debris, and (d) shooting. Indirect impacts include (a) competition with the commercial fishery for prey, (b) disruption of the food web due to commercial fishery removals, (c) disruption of avian feeding habits resulting from dependence on fishery waste (d) fish-waste related increases in gull populations which relate to survival of other bird species, and (e) marine pollution and changes in water quality.

Amounts of groundfish TACs will influence the degree of fishery interactions on seabirds. Life history information is sparse for many colonial and pelagic seabirds, and other migratory birds. All effects of commercial fisheries are not known. However, in accordance with procedures outlined by USFWS to minimize negative interactions between groundfish activities and short-tailed albatross (and other seabirds), NMFS will continue to (1) maintain and improve observer training in identification of seabirds and in reporting of such encounters; (2) encourage fishermen to recognize and avoid situations likely to be hazardous to seabirds; and (3) foster improved compliance regarding disposal of debris by ships at sea as required by Marine Plastic Pollution Research and Control Act and with the International Convention on the Prevention of Pollution by Ships, 1973, and the subsequent protocol known as MARPOL 73/78.

Seabirds consume commercially important fish species such as walleye pollock, Atka mackerel, and Pacific herring. However, noncommercial fish and invertebrate prey such as capelin, sand lance, squid, and zooplankton generally make up a large portion of the diet in most areas. Those species for which seabirds and commercial fishermen directly compete usually involve different age classes of fish. Seabirds consume juvenile groundfish, while fisheries target adult-sized groundfish. Thus, the likelihood of direct competition for prey is reduced. In this regard, the levels of TAC may be irrelevant to seabirds, although the TAC may reflect on the magnitude processing wastes and its effect on localized gull populations. There is also concern that commercial fisheries may disrupt prey availability for seabirds either through bycatch of small fish or through general disruption of the food web. Analysis of commercial bycatch has indicated that the take of age-0 and age-1 pollock is low compared to the biomass of these fish. The significance of the take of noncommercial fish and cephalopod species cannot be assessed, because the biomass of these species remains unknown. Disruption of the pelagic food web by boat traffic and trawling remains a concern, but there is no data to indicate this has affected prey availability.

Finally, the issue of fish processing waste and its potential to create a dependence on artificial food sources. Gulls are attracted to the fish wastes discharged at processing plants, and may be subject to population expansion in response to sustained processing and discharge activities (Vermeer and Irons 1991). Such artificially expanded gull populations increase predation on other seabird species and displace other species from nesting sites. Finally, closures of commercial fisheries and curtailment of processing can stress localized populations of fish-waste dependent seabirds which then suffer mortality resulting from weakened physical condition or aberrant behaviors (USFWS to EPA, September 13, 1994, NPDES Permit AK-G52-0000).

Status of marine birds under the ESA

Endangered and Threatened Species

The following endangered and threatened marine bird species may occur in the Gulf of Alaska and Bering Sea/Aleutian Islands areas.

Short-tailed Albatross	*Diomedia albatrus*	Endangered
Spectacled Eider	*Somateria fishcheri*	Threatened
Steller's Eider	*Polysticta stelleri*	Category 1
Red-legged Kittiwake	*Rissa brevirostris*	Category 2
Marbled Murrelet	*Brachyramphus marmoratus*	Category 2
Kittlitz's Murrelet	*Brachyramphus brevirostris*	Category 2
Peregrine Falcon	*Falco peregrinus anatum*	Endangered

Short-tailed albatross

The short-tailed albatross is listed as endangered. The world breeding population of this species was estimated to be 400 birds in 1988, and has now increased to over 700 birds (Richardson, 1994), and continues to increase by about 7 percent per year (USFWS 1993). As the population increases, the potential for interactions between this species and commercial fisheries increases. However, the short-tailed albatross population is steadily increasing due to its protection on the breeding grounds and there is currently no evidence that groundfish fisheries in Alaskan waters are impeding the short-tailed albatross' recovery.

Past observations indicate that as with other albatrosses, older short-tailed albatrosses are present in Alaska primarily during summer and fall months along the shelf break from the AP to the GOA, although 1- and 2-year old juveniles may be present at other times of the year (USFWS 1993). Consequently, these albatrosses generally would be exposed to fishery interactions most often during summer and fall, in the latter part of the second and the whole of the third fishing quarters.

In interactions with fishing gear or debris, two juvenile short-tailed albatross are known to have drowned in fishing gear (presumed longline), one in the BS in 1983 and one in the GOA in 1987. The USFWS received eight reports of short-tailed albatross observations in the BSAI and GOA fisheries in 1992, six of which came from commercial fishing vessels. The National Marine Fisheries Service's observer program continues to provide important data on interactions and distributions of these birds (Camp 1993). Ingestion of plastic debris has become an increasing phenomenon for short-tailed albatrosses, with unknown population effects (USFWS 1993).

In regard to competition for food resources, albatrosses are surface feeders that take principally small fish (e.g., larval and juvenile walleye pollock and sablefish), squid, and zooplankton, much of which is presumed to be of little commercial interest. Additionally, the Council will soon consider management measures that would impose mesh size restrictions to decrease the incidental catch of juvenile and undersized pollock. The importance of commercial fish species in the short-tailed albatross's diet and the effects of the commercial fishery on this species are not well known, but direct competition for food supplies is probably not a substantial problem for this seabird species (USFWS 1993).

In summary, the short-tailed albatross population is steadily increasing, and there is no evidence that groundfish fisheries in Alaska have diminished the species' recovery. The short-tailed albatross could be affected by direct mortality in fishing equipment or from discarded plastics, and indirectly through changes in the marine food webs and water quality. Although any mortality caused by commercial fishing would be a cause for concern, the expected incidental take of up to two short-tailed albatrosses during harvest of 1993 groundfish TACs is not expected to jeopardize the continued existence of the species.

Formal consultation was concluded on the effects of the NMFS Interim Incidental Take Exemption Program on the short-tailed albatross and other species listed under the ESA and under the jurisdiction of the U.S. Fish and Wildlife Service (FWS) on July 3, 1989. That consultation concluded that BSAI and GOA groundfish fisheries would adversely affect the short-tailed albatross and would result in the incidental take of up to two birds per year, but would not jeopardize the continued existence of that species. Subsequently, Section 7 consultation has been reinitiated for major changes to the FMP or fishery that might affect the short-tailed albatross; these have been informal consultations, and have concluded that no additional adverse impacts beyond those in the aforementioned formal consultation would occur. These subsequent informal consultations include: (1) 1992 BSAI and GOA TAC specifications, January 17, 1992; (2) 1993 BSAI and GOA TAC specifications, February 1, 1993, and clarified February 12, 1993; (3) delay of the second quarter pollock fishing season in the GOA, December 22, 1992; (4) careful release of halibut in hook-and-line fisheries, March 12, 1993; (5) delay of the second pollock fishing seasons in the BSAI and GOA, March 12, 1993; (6) BSAI Amendment 28, April 14, 1993; (7) GOA Amendment 31, July 21, 1993; (8) 1994 BSAI and GOA TAC specifications, February 14, 1994; (9) Experimental Trawl Fishery, Kuskokwim Bay to Hooper Bay, June 22, 1994; and (10) 1995 BSAI and GOA TAC specifications, February 7, 1995. Following the taking of a short-tailed albatross in August 1995, NMFS requested reinitiation of consultation on the 1995 BSAI and GOA TAC specifications on September 8, 1995.

American peregrine falcon

This species has substantially recovered in numbers over the years, and most biologists believe it can be delisted. Although this subspecies is rare to coastal areas, it has been found in coastal western and south central Alaska. Peregrine falcons prey upon seabirds and ducks. No direct impacts can be expected to result from the fishery, and indirect impacts appear unlikely.

Spectacled eider

The spectacled eider is listed as threatened under the ESA. The final rule to list the spectacled eider was published May 10, 1993 (58 FR 27474-27480). The spectacled eider's marine range is not known, although Dau and Kistchinski (1977) review evidence that they winter near the pack ice in the northern Bering Sea. This eider is rarely seen in U.S. waters except during molting in northeast Norton Sound (August-September) and in migration near St. Lawrence Island. The lack of observations in U.S. waters of the BSAI suggests that, if not confined to sea ice polyneas, they likely winter near the Russian coast (USFWS 1993).

Spectacled eider breeding populations have declined steadily in Alaska, to a current estimate of a few thousand pairs compared with as many as 70,000 pairs 20 years ago. These sea ducks feed on benthic mollusks and crustaceans taken in shallow marine waters or on pelagic crustaceans. Based on current information and hypotheses, the BS groundfish fishery is outside their normal marine range. Based on the apparent distance between principal spectacled eider range and the fisheries, the USFWS concluded that the 1993 TACs are not likely to adversely affect this threatened species. The spectacled eider may be indirectly affected by increased predation by populations of large gulls which expand in relation to fish processing wastes.

The Fish and Wildlife Service has received reports of unidentified eiders colliding with intensely illuminated crab vessels in the winter Bering Sea opilio crab fishery. These species could include king, common, and/or spectacled eiders. Observer and volunteer data from forthcoming crab fisheries should provide an indication of the species involved and the magnitude of the take.

Steller's eider

The Steller's eider is a Category 1 "warranted but precluded" species which warrants listing, but is awaiting the ESA processing of other higher priority species. The Steller's eider may be listed in late 1994 or early 1995 (Cochrane, personal communication).

The USFWS estimates that at least 140,000 Steller's eiders spent the fall and winter of 1992 in near-shore waters along the Alaska Peninsula and from Kodiak Island to Kachemak Bay in Cook Inlet. Most of the world's Steller's eiders migrate from Siberian breeding grounds to lagoons on the north side of the Alaska Peninsula in the fall. They then winter on the south side of the Peninsula from Kodiak Island to Unalaska Island.

Steller's eiders typically feed on benthic mollusks and crustaceans taken from shallow waters of lagoons and bays. Consumption of fish is very limited. Feeding habits indicate the species would not come into direct contact with groundfish vessels. While indirect impacts are possible from vessel groundings or discharges that affect near-shore lagoons, the potential for interaction with the commercial groundfish fishery is low and the USFWS concluded that 1993 groundfish TACs are not likely to adversely affect this Category 1 candidate species.

Marbled murrelet

Marbled murrelet was listed as threatened in its Washington, Oregon, and California range (57 FR 45328, October 1, 1992), principally due to loss of breeding habitat, but remains a Category 2 candidate species in Alaska pending further evaluation of their status. This species is most numerous in Alaska. Although no one has systematically surveyed marbled murrelet numbers in Alaska, the USFWS estimates that at least 124,000 marbled and Kittlitz's murrelets were in Alaskan waters in 1992. The USFWS determined in a technical assistance memorandum to NMFS accompanying the 1989 biological opinion that marbled murrelets may suffer extensive mortalities in near-shore gillnet fisheries from California to Alaska. Since marbled murrelets typically forage within a few kilometers of shore on small prey (e.g., sand lance and herring), there is no indication that offshore fisheries adversely affect this species. While high mortality in near-shore (within waters of the State of Alaska) gillnet fisheries has been recorded, there is little evidence that off-shore fisheries have been detrimental to the species. Furthermore, the Council is considering a management measure that would restrict gears permissible for use in groundfish fisheries to improve gear specificity and reduce unwarranted incidental catch and mortality of non-groundfish species.

Other Candidate species

Red-legged kittiwakes and Kittlitz's murrelets have been added to the candidate list as Category 2 species because of indicated population declines. Red-legged kittiwakes have declined substantially on the Pribilof Islands where most of the world's population breeds. Reasons for the declines are not understood, although declines in available prey have been discussed. Because these birds typically feed on juvenile prey that are not of commercial interest to the groundfish industry, direct competition with commercial fisheries should be minimal and the TAC level should not affect these seabirds. Indirect effects of commercial fisheries remain to be studied.

SEABIRD
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Analysis of Alternatives - Impacts on Seabirds

Alternative 1 would not take into account the most current information available on the status of groundfish species populations, including the declining GOA pollock population. Adoption of the 1995 TACs for 1996 would result in a level of fishing equal or below that for 1996. Adoption of the 1995 TACs for 1996 would result in a level of fishing below that of 1994 for GOA pollock, and the same and slightly higher for BSAI pollock and Atka mackerel, which are an important marine mammal prey. Since these species are important marine mammal prey and the recommended TACs are higher in 1995 than those proposed for 1996 for pollock in the GOA Alternative 1 would take more fish than recommended by the Council and has potential to decrease the amounts of pollock available to seabirds.

Alternative 2 would take into account the most current information regarding the status of individual groundfish species populations. Alternative 2 is not likely to adversely affect seabirds because it incorporates the best available estimation of stock size.

3.2.4 Impacts on predators and prey

A synopsis of predator/prey relationships is included in Appendix 1 of the Final Environmental Assessment for the 1995 Groundfish Total Allowable Catch Specifications Implemented under the authority of the Fishery Management Plans for the Groundfish of the BSAI and GOA. It provides a summary of prey species that are consumed by the target groundfish species categories and other fish and shellfish. Any amounts of groundfish harvests remove animals that otherwise would have remained in the ecosystem where they prey on other animals and/or are preyed upon. Many of the commercial species are adult-size fish that prey on juvenile groundfish target species categories or on other animals. Assessment of groundfish stocks includes an adjustment for natural mortality, including predation.

The proposed 1996 TACs are similar to the 1995 TACs for the BSAI and the proposed 1996 TACs are less than the 1995 TACs for the GOA, so less groundfish will be removed from the ecosystem. Fewer numbers of fish would remain in the system preying on other animals or being preyed upon. Since the proposed 1996 TACs are similar to the 1995 TACs larger numbers would remain as predators and prey.

3.2.5 Impacts on threatened and endangered Pacific salmon

Pacific salmon are caught incidentally in groundfish fisheries. Of the salmon that might be taken incidentally off Alaska, three species from the Snake River system are listed or proposed to be listed under the ESA as threatened or endangered, including sockeye (Oncorhynchus nerka), spring/summer chinook (O. tschawytscha), and fall chinook salmon.

Effects of the GOA and BSAI groundfish fisheries on listed salmon were considered by informal consultations with the NMFS Northwest Region for fishing years 1992 and 1993 (February 20, 1992, April 21, 1993, respectively). In 1993, the Alaska Region wrote the environmental assessment documents for the fisheries, a biological assessment (March 17, 1993) to initiate Section 7 Consultation, and the decisional document that accompanied the April 21, 1993, Section 7 memorandum concluding that salmon species listed under the ESA were not likely to be adversely affected by the 1993 TACs, or by a change of the non-roe pollock fishing season in the BSAI. Additional informal Section 7 consultation occurred in 1993 for BSAI Amendment 28 (June 7, 1993), and for GOA Amendment 31 (September 22, 1993). In these latter two informal consultation memos NMFS stated that it was essential that monitoring efforts be continued and that NMFS continue to seek additional information regarding potential impacts to listed fish. NMFS believed that the potential effects of the GOA and BSAI Groundfish fisheries to listed salmon warranted formal consultation for future actions.

Formal consultation was done for the federal fishing proposal for fishing year 1994 and future years. The Alaska Region wrote the biological assessment (November 16, 1993) containing a description of anticipated fishing activities conducted under the FMPs, including the annual specification amount for 1994 and estimated potential takings (portion of salmon bycatch) by the fishery of the listed salmon. The Biological Opinion was issued January 19, 1994. In it NMFS made the determination that the proposed action would not jeopardize the continued existence of listed salmon species. Conservation measures were recommended to reduce salmon bycatch in the fisheries and improve the level of information about the salmon bycatch. The no jeopardy determination was based on the assumption that if total salmon bycatch is controlled, the impacts to listed salmon will be also. Compliance with the Biological Opinion is stated in terms of limiting salmon bycatch to under 40,000 for chinook salmon in either fishery and 200 and 100 sockeye salmon in the BSAI and GOA fisheries, respectively.

Consultation must be reinitiated if: the amount or extent of taking specified in the Incidental Take Statement is exceeded; new information reveals effects of the action that may affect listed species in a way not previously considered; the action is subsequently modified in a manner that causes an effect to listed species that was not considered in the biological opinion; or, a new species is listed or critical habitat is designated that may be affected by the action.

3.3 Socioeconomic impacts

The following table shows the ABCs and TACs for 1994 and the proposed ABCs for 1995 specified for each target species category. Based on the above 1994 exvessel prices, potential gross value of these TACs can be compared for Alternatives 1 and 2. This information is presented in the table that follows.

3.3.1 Impacts on gross earnings

The actual value realized from the groundfish TACs is dependent on factors unquantifiable at present, including market demand, costs of harvesting and processing, proportion of catch processed at sea (value added), and the degree to which the TACs are constrained by PSC bycatch limitations.

For comparative purposes estimates can be made on the gross difference in exvessel value of TACs.

Table 9 --1995 and 1996 TACs, and estimated value.

BSAI Species	Amount (mt) 1995 TAC	1996 TAC	Value 1995	1996
Pollock	1,250,000	1,250,000	n/a	n/a
P. cod	191,000	191,000		
Sablefish	3,800	3,800		
Flathead sole	30,000	30,000		
Arrowtooth	10,227	10,227		
G. turbot	7,000	7,000		
Yellowfin sole	190,000	190,000		
O. flat	19,540	19,540		
Rockfish	20,536	20,536		
Rock sole	60,000	60,000		
Atka mackerel	80,000	80,000		
Total TAC	1,921,103	1,921,103 (mt)		
Difference	NO CHANGE	NO CHANGE	NO CHANGE	NO CHANGE

GOA Species	Amount (mt) 1995 TAC	1996 TAC	Value 1995	1996
Pollock	65,360	52,700	n/a	n/a
P. cod	69,200	65,000		
Sablefish	21,500	21,500		
Arrowtooth	35,000	35,000		
Deep flat	11,080	11,080		
Rex sole	9,690	9,690		
Flathead sole	9,740	9,740		
Shallow flat	18,630	18,630		
Rockfish	22,715	28,579		
Atka mackerel	3,240	3,240		
Total TAC	266,155	255,159		
Difference		-10,996 (mt)		

These figures illustrate that under Alternative 2, the gross exvessel value of 1996 represents little or no change in the BSAI and a decrease of $10,996 in the GOA as compared to the amounts of 1995 TACs. The ex-vessel price data reported in PacFIN are from the ADF&G ticket database. Typically, price data are provided for catch taken for on-shore processing, but not for catch taken for at-sea processing. For 1995, PacFIN data has been unavailable due.

3.3.2 Impacts on bycatch

The prohibited species bycatch management regime in the BSAI and GOA is the same under Alternatives 1 and 2. Bycatch management measures implemented to date specify PSC limits for BSAI and GOA Pacific halibut, and BSAI Pacific herring, red king crab, and C. bairdi Tanner crab. Attainment of a PSC limit triggers fishery closures that are intended to limit further bycatch amounts of the prohibited species. The PSC limits are set at levels that are not believed to pose biological concern, although significant allocative and other socioeconomic concerns arise when bycatch restrictions imposed on the groundfish fleet reduce revenue to the groundfish industry through foregone groundfish harvests, or to other directed fisheries through reduced quotas to compensate for bycatch removals in the groundfish fisheries. Effects of PSC limits are analyzed in EAs prepared by the Council when limits are set or adjusted.

Prohibited species bycatch restrictions for the Alaska groundfish fisheries triggered closures in 1995. Although these closures limited additional amounts of prohibited species bycatch in Alaska groundfish operations, they also resulted in foregone revenues to Alaska groundfish fishermen. The amount and type of fishing activity that would have occurred absent halibut restrictions is uncertain.

No significant effects on stocks of prohibited species are expected under either Alternatives 1 or 2. Specified PSC limits will control total amounts of Pacific halibut, crab, and herring that might be caught as bycatch.

4.0 CONCLUSIONS

Groundfish harvesting under the preferred Alternative 2, the proposed 1996 TACs, may either directly or indirectly adversely affect Steller sea lions, the short-tailed albatross, or salmonids listed as threatened and endangered under the ESA. The fisheries are not expected to affect those listed species in a manner, or to an extent, not previously considered, and would not jeopardize the existence of those species. Current information indicates that groundfish fisheries are not likely to adversely affect groundfish stocks, other seabirds proposed for listing or candidates under the ESA, threatened or endangered Pacific salmon, species prohibited in groundfish fisheries, or other aspects of the human environment. Additional information is needed to completely assess the impacts of the groundfish fishery on marine food webs and ecosystems, and in particular, on many seabirds. This expectation of no additional adverse effects is based on information presented earlier in this document as summarized as follows:

Groundfish stocks

Under Alternative 2, 1996 TACs for each target groundfish category are proposed to be equal to the TACs recommended by the Council at its September 1995, meeting. Under this alternative, the sum of the BSAI and GOA TACs based on the initial TACs would be 2,000,000 mt and 267,917 mt, respectively.

In the BSAI, the sum of the 1996 proposed groundfish TACs is 2,000,000 mt, identical to the TAC specified for 1995 and substantially below the sum of the Council's and Plan Team's proposed 1996 ABCs (2,929,885 mt; 3,134,909 mt). Under the FMP, TACs are limited by optimum yield (OY) to 2,000,000 mt. Within the OY, harvests are anticipated to continue to be limited by halibut, herring, and crab PSC restrictions in 1996.

In the GOA, the sum of the 1996 proposed groundfish TACs is 267,917, which is lower than the TACs specified for 1995 and substantially below the sum of the Council's and Plan Teams 1996 ABCs (477,110 mt; 478,660 mt). The sum of 1996 TACs will be less than the total of 1996 ABCs or OFL for target species.

Species listed as threatened or endangered, or proposed for listing, under the ESA

Alternative 2, 1996 proposed TACs, would result in little change in removals of groundfish or of fishing activity in the BSAI and GOA from those in 1995. Alternatives 1 and 2 are expected to have no adverse effects on Steller sea lions, seabirds proposed for listing, candidate seabirds, and threatened or endangered Pacific salmon. No additional adverse effects are expected for Pacific salmon, or for the spectacled eider, Steller's eider, or marbled murrelet because of limited overlap in range between those species and the groundfish fishery. Either alternative may adversely affect Steller sea lions, the short-tailed albatross, or listed salmonids; however, those effects are not expected to exceed those already considered in consultations (USDOC 1993a, 1993b). Section 7 consultations have been finalized and approved by the Assistant Secretary on January 19, 1994, for harvesting the 1995 TACs and conclude that Alternative 2, harvesting at the 1995 TACs, is not expected to jeopardize the existence of those species. Management measures in effect under either alternative will disperse fishing effort (spatial and temporal allocations of groundfish and prohibited species and closed areas around sea lion rookeries for trawl gear) and minimize fishery interactions with non-groundfish species. New management measures being considered (season changes for BSAI and GOA pollock fisheries and trawl mesh size regulations) would reduce the catch and mortality of juvenile commercial groundfish.

Species prohibited in groundfish fisheries

Neither alternative is expected to adversely affect stocks of fish prohibited in groundfish fisheries. Bycatches of Pacific halibut, crabs, and herring are controlled by PSC limits established independently of 1996 TACs.

Socioeconomic impacts

Alternatives 1 and 2 are anticipated to have different net economic benefits. The actual value realized is dependent on factors unquantifiable at present, including market demand, costs of harvesting and processing, proportion of catch processed at sea, and the degree to which the TACs are constrained by PSC bycatch limitations. Additional information is needed to fully assess impacts of commercial fishing activities on marine food webs and ecosystems.

FINDING OF NO SIGNIFICANT IMPACT

For the reasons discussed above, implementation of either Alternative would not significantly affect the quality of the human environment. Therefore, the preparation of an environmental impact statement on the preferred alternative is not required by section 102(2)(C) of the National Environmental Protection Act (NEPA) or its implementing regulations.

______________________________ ______________________________
DATE

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